# B&O BEOCORD 5500

MODEL

SERVICE MANUAL

# Beogram CD 5500

Type 5131, 5132, 5133, 5134, 5135

# Beogram CD 6500

Type 5136, 5137, 5138, 5139, 5140

# Beogram CD 7000

Type 5151, 5152, 5153, 5154, 5155

# CD-Mechanism Version II
# Beogram CD 7000

Service Manual
Danish, English

BANG & OLUFSEN

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Beogram CD 6500
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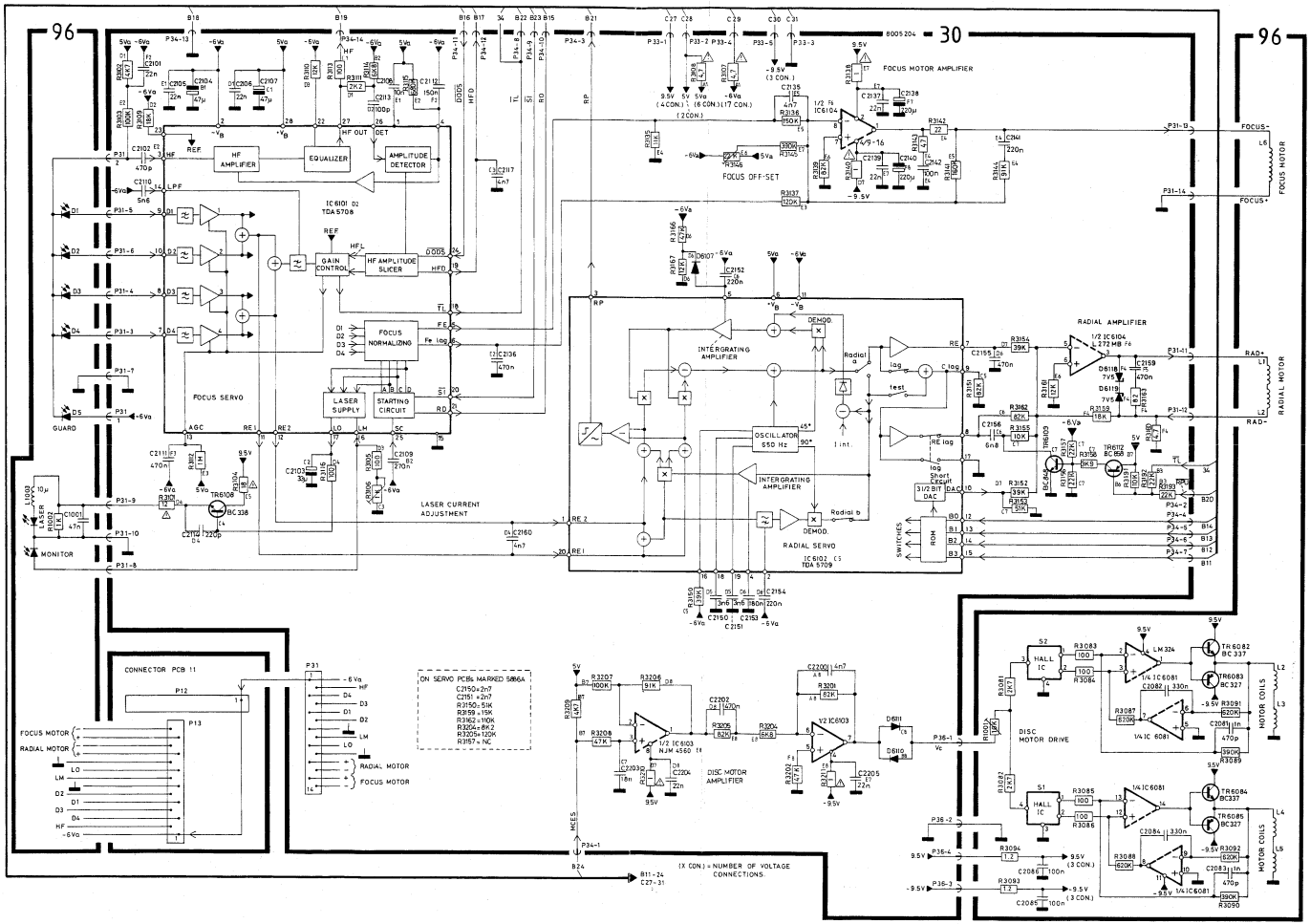
Beogram CD 7000 –
CD-Mechanism Version II

TECHNICAL SPECIFICATIONS

| | |
|---|---|
| Frequency range | 3-20.000 Hz ±0.3 dB |
| Signal-to-noise ratio | >100 dB/110 dB A-weighted |
| Dynamic range | >96 dB |
| Harmonic distortion incl. noise | <0.0025% at 0 dB |
| | <0.025% at -20 dB |
| Channel separation | >101 dB |
| Channel difference | <0.08 dB |
| *Converter system* | 2 x 16 bit, 4 x oversampling 176.4 kHz |
| Low pass filter | Digital + Bessel/elliptical analog |
| Damping >20.000 Hz | >50 dB |
| Phase error between L and R | 0 degree at 20-20.000 Hz |
| Output, analog | 1.3 V RMS at 0 dB |
| Output, digital | For digital equipment |
| Power supply | Type no. 5131: 220 V |
| | Type no. 5132: 240 V |
| | Type no. 5133: 120 V |
| | Type no. 5134: 100 V |
| | Type no. 5135: 240 V |
| Power frequency | 50-60 Hz |
| Power consumption | 23 watts |
| Dimensions W x H x D | 42 x 7.5 x 32.5 cm (16½" x 3" x 12¾") |
| Weight | 6.3 kg (13.9 lbs) |

**Subject to change without notice**

**DIAGRAM A** (Servo and Disc Motor System)



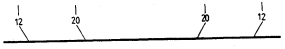
## DIAGRAMFORKLARING

På diagrammet er der angivet typenumre på transistorer og IC'er i de tilfælde hvor typenummeret er entydigt for komponentens placering i kredsløbet – f.eks. TR20/BC 557B

Hvis positionsnummeret er efterfulgt af en stjerne **skal** reservedelsnummeret benyttes, da denne komponent er specielt udvalgt – f.eks. TR102*.

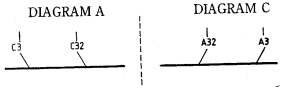
**Ledningsforbindelser**
Ledningsforbindelserne på diagrammet er samlet i »bundter«. De enkelte ledninger er forsynet med koder, der fortæller hvortil de går.

INTERN FORBINDELSE
PÅ EN DIAGRAMSIDE




Interne forbindelser på en diagramside angives med et tal. Knækket på ledningen viser i hvilken retning den anden ende af ledningen findes.

FORBINDELSE TIL EN ANDEN
DIAGRAMSIDE




Forbindelsen til en anden diagramside angives med et tal, samt bogstav indikation på det diagram forbindelsen går til.

**Forsyningsspændinger**
En pil og spændingen viser, hvor forsyningsspændingerne går ind i et print.

Eksempel: Ved siden af forsyningsspændingen står f.eks. 7 CON. Det betyder at denne pil, og dermed forsyning går til 7 steder på denne diagramside (7 CON. = 7 connections).

**Symbol for sikkerhedskomponenter**

Ved udskiftning af komponenter med dette symbol skal der anvendes komponenter med samme reservedelsnummer. Den nye komponent skal monteres på samme måde som den udskiftede.

## EXPLANATION OF DIAGRAM

Type numbers of transistors and IC's have been indicated on the diagram in those cases where the type number is unambiguous for the position of the component in a circuitry – e.g. TR20/BC 557B.

If the position number is followed by an asterisk the spare part number **must be used** because this component has been expecially selected – e.g. TR102*.

**Wiring Connections**
The wiring connections on the diagram are assembled in "bundles". The individual wires are coded to indicate to where they are leading.

INTERNAL CONNECTION
ON ONE DIAGRAM PAGE

Internal connections on a diagram page are indicated by a number. The bend of the wire indicates in which direction the other end of the wire may be found.

CONNECTION TO ANOTHER
DIAGRAM PAGE

Connections to another diagram page are indicated by a number, as well as by a letter of the diagram to which the connections lead.

**Supply Voltage**
An arrow and the voltage show where the supply voltages are fed to a PCB.

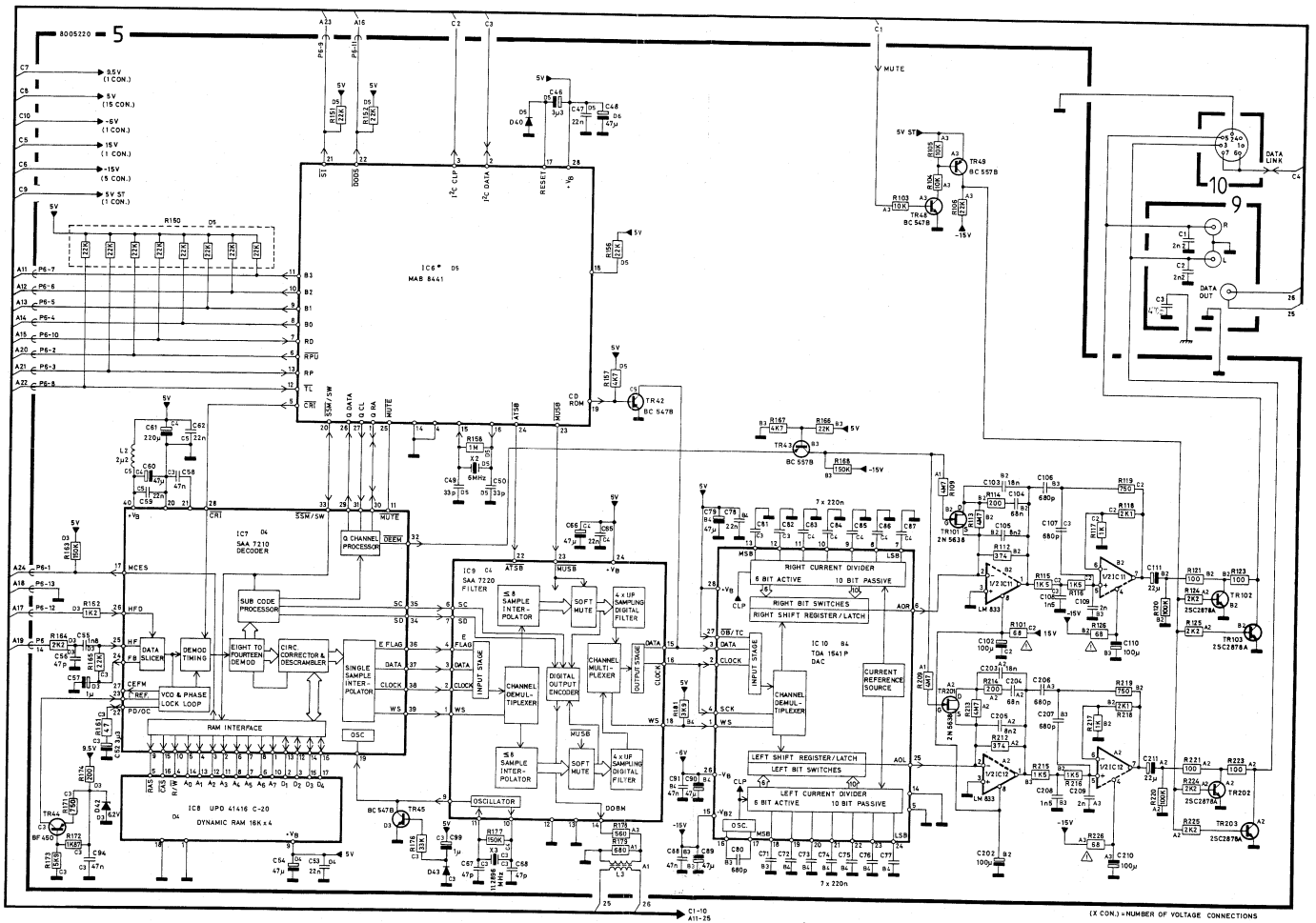
Example: Next to the supply voltage it says e.g. 7 CON. This means that this arrow, and thus the supply goes to 7 different places on this diagram pages (7 CON. = 7 connections).

**Symbol for Safety Components**

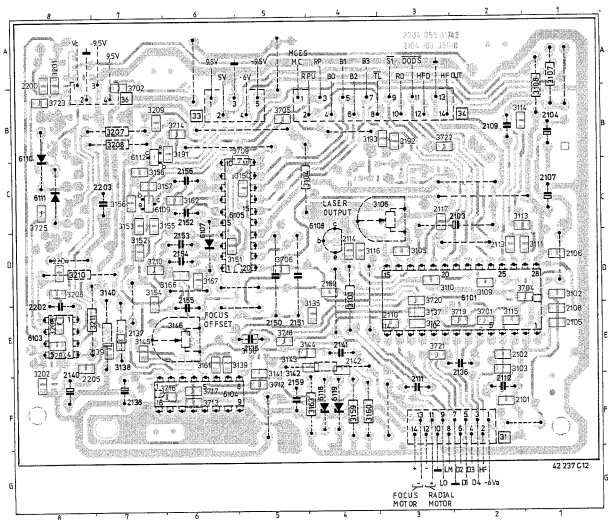
When replacing components with this symbol components with identical part numbers are to be used. The new component must be fitted in the same way as the one replaced.

2-1
2-1

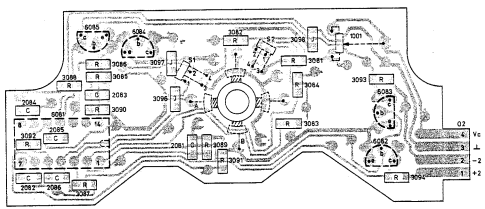
DIAGRAM B (Decoder)



SERVO PCB 30

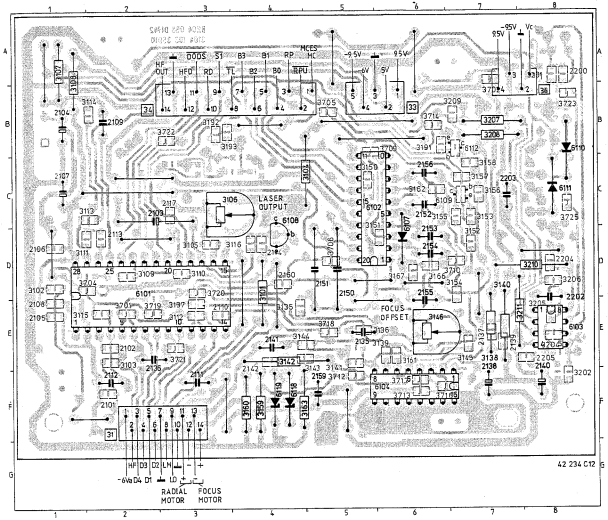



DISC MOTOR CONTROL



2-3

SERVO PCB 30




DISC MOTOR CONTROL

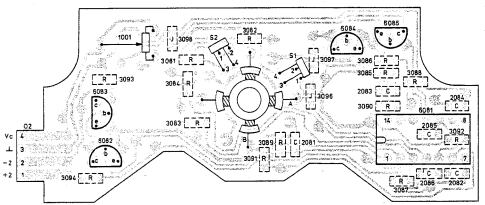
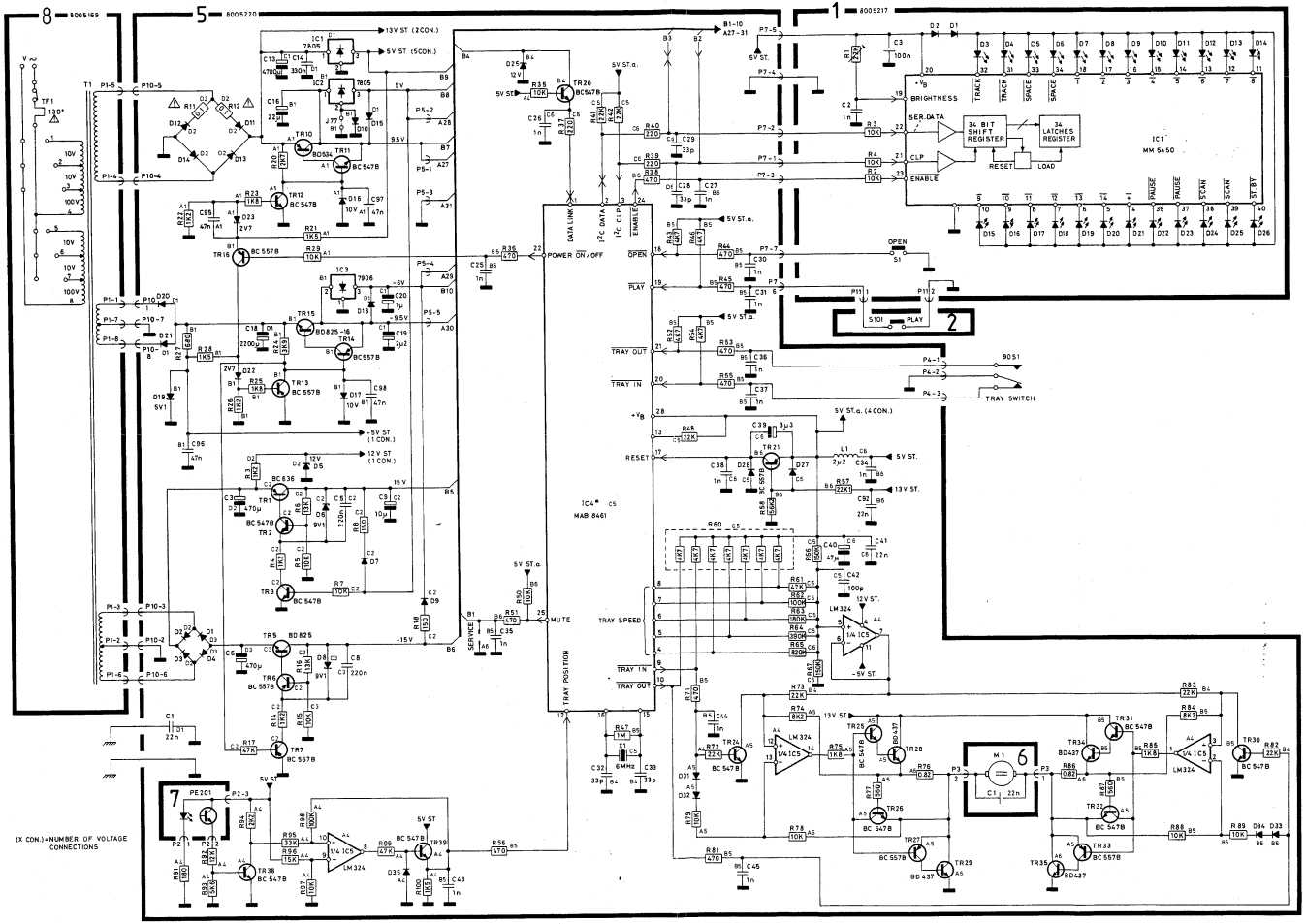
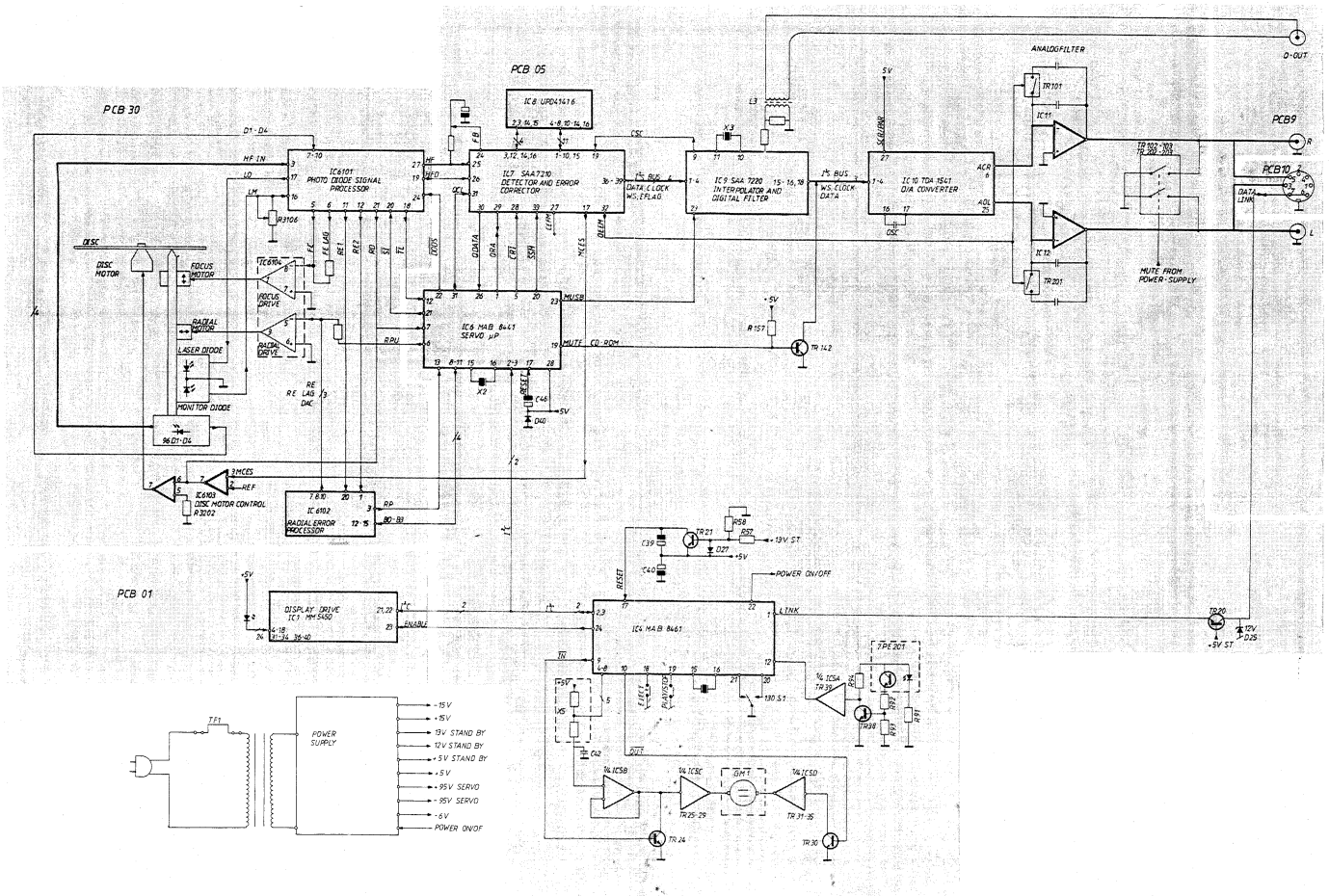


**DIAGRAM C (Power Supply, Control and Display)**

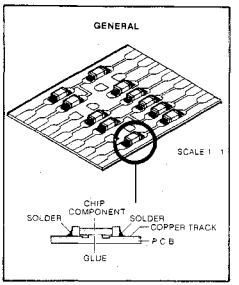


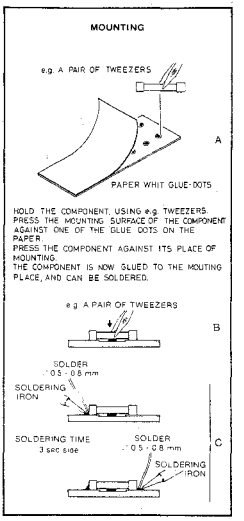
BLOCK DIAGRAM

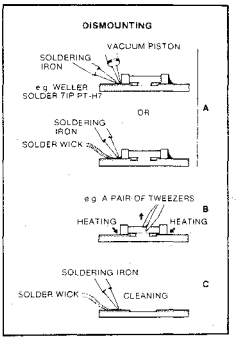


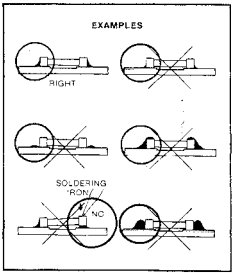
LIST OF ELECTRICAL PARTS

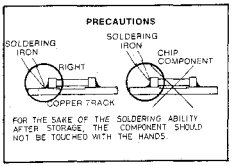
In the player chip components have been applied. For insertion and removal of chip components see the figure below.



**Standard resistors:** *Resistors not mentioned are standard resistor.*

Resistors SMD 5% 1/8 W

| | X1 | X10 | X100 | X1K | X10K | X100K | X1M | X10M |
|---|---|---|---|---|---|---|---|---|
| 1.0 | 5011333 | 5011295 | 5011274 | 5011197 | 5011272 | 5011207 | 5011320 | 5011332 |
| 1.2 | | 5011296 | 5011299 | 5011273 | 5011310 | 5011195 | 5011321 | |
| 1.5 | | 5011203 | 5011205 | 5011306 | 5011189 | 5011198 | 5011322 | |
| 1.8 | | 5011297 | 5011300 | 5011286 | 5011311 | 5011196 | 5011323 | |
| 2.2 | 5011282 | 5011192 | 5011194 | 5011307 | 5011312 | 5011208 | 5011324 | |
| 2.7 | 5011283 | 5011275 | 5011301 | 5011183 | 5011271 | 5011316 | 5011325 | |
| 3.0 | | | | | 5011520 | | | |
| 3.3 | 5011289 | 5011202 | 5011188 | 5011184 | 5011313 | 5011317 | 5011326 | |
| 3.9 | 5011290 | 5011298 | 5011302 | 5011308 | 5011314 | 5011318 | | |
| 4.7 | 5011291 | 5011191 | 5011303 | 5011193 | 5011284 | 5011206 | | |
| 5.1 | | | | | | 5011436 | | |
| 5.6 | 5011292 | 5011276 | 5011304 | 5011309 | 5011199 | 5011288 | | |
| 6.8 | 5011293 | 5011190 | 5011305 | 5011186 | 5011200 | 5011319 | | |
| 8.2 | 5011294 | 5011185 | 5011187 | 5011285 | 5011315 | 5011201 | | |

Resistors 5% 1/2 W

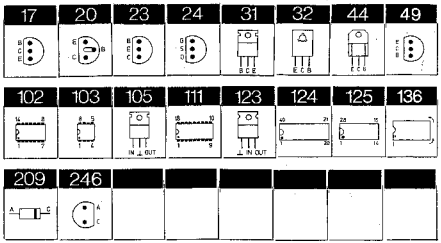
| | X1 | X10 | X100 | X1K | X10K | X100K | X1M | X10M |
|---|---|---|---|---|---|---|---|---|
| 1.0 | | 5011000 | 5011013 | 5011028 | 5011044 | 5010313 | 5011069 | 5011083 |
| 1.2 | 5011406 | 5011001 | 5011014 | 5011030 | 5011045 | 5011058 | 5010421 | |
| 1.5 | 5010727 | 5011002 | 5011015 | 5011031 | 5011046 | 5011059 | 5011071 | |
| 1.8 | 5010857 | 5010787 | 5011016 | 5011033 | 5011047 | | 5011072 | |
| 2.2 | 5011335 | 5010708 | 5010815 | 5011034 | 5011048 | 5011061 | 5011074 | |
| 2.7 | | 5010803 | 5011018 | 5010055 | 5011049 | 5011062 | 5011075 | |
| 3.3 | 5010255 | 5011007 | 5011019 | 5011037 | | 5011063 | 5010381 | |
| 3.9 | | 5010722 | 5011021 | 5010700 | 5011051 | | 5010392 | |
| 4.7 | 5010765 | 5011009 | 5011022 | 5010035 | 5010036 | 5011065 | 5011078 | |
| 5.6 | | 5011010 | 5011023 | 5011041 | | 5011066 | 5011079 | |
| 6.8 | 5010874 | 5011011 | 5011024 | 5011042 | 5010810 | 5011067 | 5011080 | |
| 8.2 | | 5011012 | 5011026 | 5011043 | 5010038 | 5011068 | 5011081 | |

Resistors 5% 1/4 W

| | X1 | X10 | X100 | X1K | X10K | X100K | X1M | X10M |
|---|---|---|---|---|---|---|---|---|
| 1.0 | 5010592 | 5010506 | 5010065 | 5010040 | 5010059 | 5010049 | 5010054 | 5010638 |
| 1.2 | | 5010595 | 5010128 | 5010153 | 5010046 | 5010047 | 5010665 | |
| 1.5 | 5011348 | 5010468 | 5010057 | 5010247 | 5010053 | 5010063 | 5010093 | |
| 1.8 | | 5010822 | 5010362 | 5010066 | 5010135 | 5010072 | 5010791 | |
| 2.2 | 5010682 | 5010448 | 5010092 | 5010064 | 5010079 | 5010120 | 5010245 | |
| 2.7 | 5010925 | 5010403 | 5010090 | 5010298 | 5010141 | 5010083 | 5010431 | |
| 3.3 | | 5010253 | 5010044 | 5010076 | 5010075 | 5010117 | 5010848 | |
| 3.9 | 5011377 | 5010622 | 5010070 | 5010069 | 5010060 | 5010073 | 5010714 | |
| 4.7 | 5010888 | 5010411 | 5010058 | 5010048 | 5010045 | 5010077 | 5011513 | |
| 5.6 | 5010706 | 5010151 | 5010067 | 5010041 | 5010061 | 5010071 | 5010658 | |
| 6.8 | 5010904 | 5010039 | 5010144 | 5010052 | 5010062 | 5010074 | | |
| 8.2 | 5010880 | 5010056 | 5010068 | 5010154 | 5010091 | 5010505 | | |

Resistors 5% 1/8 W

| | X1 | X10 | X100 | X1K | X10K | X100K | X1M | |
|---|---|---|---|---|---|---|---|---|
| 1.0 | | 5011464 | 5011357 | 5010816 | 5010935 | 5011440 | 5011459 | 5020875 |
| 1.2 | | 5011351 | 5011084 | 5011442 | 5011338 | 5011341 | 5011175 | |
| 1.5 | | 5011463 | 5011443 | 5011178 | 5011364 | 5011398 | 5011460 | |
| 1.8 | | | 5011350 | 5011361 | 5011344 | 5011468 | | |
| 2.2 | 5011032 | 5011376 | 5010886 | 5011353 | 5010833 | 5011369 | 5011342 | |
| 2.7 | | 5011471 | 5011355 | 5011362 | 5011366 | 5011370 | 5011478 | |
| 3.3 | | | 5011337 | 5010827 | 5011346 | 5011371 | 5011462 | |
| 3.9 | | 5011438 | | 5011157 | 5011457 | 5011372 | 5020876 | |
| 4.7 | 5011363 | 5011038 | 5011441 | 5011363 | 5010937 | 5011343 | | |
| 5.6 | | 5011412 | 5011358 | 5010885 | 5011166 | 5011340 | | |
| 6.8 | | 5011356 | 5011336 | 5010839 | 5011367 | 5011458 | | |
| 8.2 | | 5011466 | 5011354 | 5011339 | 5011368 | 5011373 | | |




**PCB 1, 8005217**
**Display**

| | | | | | |
|---|---|---|---|---|---|
| IC1Δ | 8340467 **124** MM 5450N | | | | |
| D1-D2 | 8300023 **209** 1N 4002 | | D3-D26 | 8330150 **246** LED red | |
| R1 | 5370068 22 kΩ 20% 0,1W | | | | |
| C2 | 4010105 1 nF 10% 63V | | C3 | 4130230 100 nF 20% 63V | |
| S1 | 7400268 contact 1 pol | | | | |
| P11 | 7220580 Plug 2 pol | | | | |
| To P7 | 6275711 Wire w/sockets 7/7 pin | | | | |

**PCB 2, 8005218**
**Contact PCB**

| | | | | | |
|---|---|---|---|---|---|
| S101 | 7400268 contact 1 pol | | | | |
| To P11 | 6275712 Wire w/sockets 2/2 pin | | | | |

**PCB 5, 8005220**
**Decoder**

| | | | | | |
|---|---|---|---|---|---|
| IC1-IC2 | 8340065 **105** 7805 PWR supl. +5 1A | | | | |
| IC3 | 8340931 **123** 7906 PWR supl. -6V 1A | | | | |
| IC4Δ | 8340957 **125** MAB 8461 | | | | |
| IC5 | 8340157 **102** LM 324 | | | | |
| IC6Δ | 8340914 **136** MAB 8441 µC | | | | |
| IC7Δ | 8340841 **136** SAA 7210 Decoder | | | | |
| IC8Δ | 8340927 **111** UPD 41416 C | | | | |
| IC9Δ | 8340855 **136** SAA 7220 Digital filter | | | | |
| IC10Δ | 8340913 **136** TDA 1541 D/A Converter | | | | |
| IC11-IC12 | 8340930 **103** LM 833N DUAL OP-AMP | | | | |
| TR1 | 8320640 **17** | BC 636 | TR27 | 8320152 **20** | BC 557B |
| TR2-TR3 | 8320097 **20** | BC 547B | TR28-TR29 | 8320427 **32** | BD 437 |
| TR5 | 8320542 **44** | BD 825-16 | TR30-TR32 | 8320097 **20** | BC 547B |
| TR6-TR7 | 8320152 **20** | BC 557B | TR33 | 8320152 **20** | BC 557B |
| TR10* | 8320369 **31** | BD 534 | TR34-TR35 | 8320427 **32** | BD 437 |
| TR11-TR12 | 8320097 **20** | BC 547B | TR38-TR39 | 8320097 **20** | BC 547B |
| TR13-TR14 | 8320152 **20** | BC 557B | TR42 | 8320097 **20** | BC 547B |
| TR15 | 8320542 **44** | BD 825-16 | TR43 | 8320152 **20** | BC 557B |
| TR16 | 8320152 **20** | BC 557B | TR44 | 8320567 **23** | BF 450 |
| TR20 | 8320097 **20** | BC 547B | TR45 | 8320097 **20** | BC 547B |
| TR21 | 8320152 **20** | BC 557B | TR48 | 8320097 **20** | BC 547B |
| TR24-TR26 | 8320097 **20** | BC 547B | TR49 | 8320152 **20** | BC 557B |
| | | | TR101 | 8320722 **24** | 2N 5638 |

| 24 | 49 | 209 | 212 | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| TR102-TR103 | 8320660 | **49** | 2SC 2878A | TR202-TR203 | 8320660 **49** 2SC 2878A |
| TR201 | 8320722 | **24** | 2N 5638 | | |

| | | | | | |
|---|---|---|---|---|---|
| D1-D4 | 8300023 | **209** | 1N 4002 | D18 D19 | 8300023 **209** 1N 4002<br>8300479 **209** ZPD 79B 5.1V |
| D5 | 8300407 | **209** | ZPD 12V | D20- | 8300023 **209** 1N 4002 |
| D6 | 8300578 | **209** | BZX 79 B9V1<br>BZX 55 B9V1 | D21<br>D22- | 8300222 **209** ZPD 2.7 V |
| D7 | 8300058 | **209** | 1N 4148 | D23 | |
| D8 | 8300578 | **209** | BZX 79 B9V1<br>BZX 55 B9V1 | D25<br>D26- | 8300407 **209** ZPD 12 V<br>8300058 **209** 1N 4148 |
| D9 | 8300058 | **209** | 1N 4148 | D27 | |
| D10 | 8300142 | **209** | AA 143 | D31- | 8300058 **209** 1N 4148 |
| D11-D14 | 8300294 | **212** | 1N 5401 | D35<br>D40 | 8300058 **209** 1N 4148 |
| D15 | 8300023 | **209** | 1N 4002 | D42 | 8300596 **209** 6.2V 2% |
| D16-D17 | 8300579 | **209** | BZX 79 B10V<br>BZX 55 B10V | D43 | 8300058 **209** 1N 4148 |

| | | | | | |
|---|---|---|---|---|---|
| R5 | 5020110 | | 10 kΩ 1% 1/4W | R118 | 5011511 2,1 kΩ 1% 1/4W |
| R6 | 5020318 | | 13 kΩ 1% 1/4W | R119 | 5011512 750 Ω 1% 1/4W |
| R11- | 5020499 | | 0.1 Ω 10% o.4W | R126 | 5020956 68 Ω 5% 0.14W |
| R12 | | | | R150 | 5030001 8 x 22 kΩ 5% 1/8W |
| R15 | 5020110 | | 10 kΩ 1% 1/4W | R171 | 5011512 750Ω 1% 1/4W |
| R16 | 5020318 | | 13 kΩ 1% 1/4W | R172 | 5021011 1.87 kΩ 1% 1/4W |
| R57 | 5020542 | | 22.1 kΩ 1% 1/4W | R173 | 5020730 5.90 kΩ 1% 1/4W |
| R58 | 5020362 | | 56.2 kΩ 1% 1/4W | R174 | 5011508 200 Ω 1% 1/4W |
| R60 | 5010862 | | 7 x 4.7 kΩ 5% 1/8W | R212 | 5011507 374 Ω 1% 1/4W |
| R76 | 5020980 | | 0.82 Ω 5% 1W | R214 | 5011508 200 Ω 1% 1/4W |
| R86 | 5020980 | | 0.82 Ω 5% 1W | R215- | 5011509 1.5 kΩ 1% 1/4W |
| R101 | 5020956 | | 68 Ω 5% 0.14W | R216 | |
| R112 | 5011507 | | 374 Ω 1% 1/4W | R217 | 5011510 1 kΩ 1% 1/4W |
| R114 | 5011508 | | 200 Ω 1% 1/4W | R218 | 5011511 2,1 kΩ 1% 1/4W |
| R115- | 5011509 | | 1.5 kΩ 1% 1/4W | R219 | 5011512 750 Ω 1% 1/4W |
| R116 | | | | R226 | 5020956 68 Ω 5% 0.14W |
| R117 | 5011510 | | 1 kΩ 1% 1/4W | | |

| | | | | | |
|---|---|---|---|---|---|
| C1 | 4000340 | | 22 nF -20+80% 40V | C48 | 4200617 47 µF 20% 10V |
| C3 | 4200102 | | 470 µF -10+100% 40V | C49- | 4000339 33 pF 5% 63V |
| C5 | 4130308 | | 220 µF 10% 63V | C50 | |
| C6 | 4200102 | | 470 µF -10+100% 40V | C52 | 4200625 3.3 µF 20% 50V |
| C8 | 4130308 | | 220 nF 10% 63V | C53 | 4000340 22 nF -20+80% 40V |
| C9 | 4200524 | | 10 µF 20% 25V | C54 | 4200617 47 µF 20% 10V |
| C13 | 4200020 | | 4700 µF 25V | C55 | 4100195 1.8 nF 5% 63V |
| C14 | 4130309 | | 330 nF 10% 63V | C56 | 4000137 47 pF 5% 63V |
| C16 | 4200544 | | 22 µF 20% 16V | C57 | 4200512 1 µF 20% 50V |
| C18 | 4200548 | | 2200 µF -10+50% 25V | C58 | 4130240 47 nF 10% 63V |
| C19 | 4200517 | | 2.2 µF 20% 50V | C59 | 4000340 22 nF -20+80% 40V |
| C20 | 4200512 | | 1 µF 20% 50V | C60 | 4200617 47 µF 20% 10V |
| C25- | 4010035 | | 1 nF 10% 63V | C61 | 4200122 220 µF -10+100% 10V |
| C27 | | | | C62 | 4000340 22 nF -20+80% 40V |
| C28- | 4000339 | | 33 pF 5% 63V | C65 | 4000340 22 nF -20+80% 40V |
| C29 | | | | C66 | 4200617 47 µF 20% 10V |
| C30- | 4010035 | | 1 nF 10% 63V | C67- | 4000137 47 pF 5% 63V |
| C31 | | | | C68 | |
| C32- | 4000339 | | 33 pF 5% 63V | C71- | 4130308 220 nF 10% 63V |
| C33 | | | | C77 | |
| C34- | 4010035 | | 1 nF 10% 63V | C78 | 4000340 22 nF -20+80% 40V |
| C38 | | | | C79 | 4200617 47 µF 20% 10V |
| C39 | 4200625 | | 3.3 µF 20% 50V | C80 | 4010122 680 pF 10% 63V |
| C40 | 4200617 | | 47 µF 20% 10V | C81- | 4130308 220 nF 10% 63V |
| C41 | 4010107 | | 22 nF -20+80% 40V | C87 | |
| C42 | 4000204 | | 100 pF 5% 63V | C88 | 4130240 47 nF 10% 63V |
| C43- | 4010035 | | 1nF 10% 63V | C89 | 4200688 47 µF 20% 50V |
| C45 | | | | C90 | 4200617 47 µF 20% 10V |
| C46 | 4200625 | | 3.3 µF 20% 50V | C91 | 4130240 47 nF 10% 63V |
| C47 | 4000340 | | 22 nF -20+80% 40V | | |

| 20 | 51 | 103 | 125 | 134 | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| | | | |
|---|---|---|---|
| C92 | 4000340 22 nF -20+80% 40V | C110 | 4200403 100 µF -10+100% 25V |
| C93- | 4130235 47 nF 20% 63V | C111 | 4200480 22 µF 20% 10V |
| C94 | | C202 | 4200403 100 µF -10+100% 25V |
| C95- | 4130210 47 nF 20% 63V | C203 | 4130267 18 nF 5% 63V |
| C98 | | C204 | 4130270 68 nF 5% 63V |
| C99 | 4200512 1 µF 20% 50V | C205 | 4100278 8.2 nF 2.5% 63V |
| C102 | 4200403 100 µF -10+100% 25V | C206- | 4100249 680 pF 2.5% 63V |
| C103 | 4130267 18 nF 5% 63V | C207 | |
| C104 | 4130270 68 nF 5% 63V | C208 | 4100230 1.5 nF 2.5% 63V |
| C105 | 4100278 8.2 nF 2.5% 63V | C209 | 4100279 2 nF 2.5% 63V |
| C106- | 4100249 680 pF 2.5% 63V | C210 | 4200403 100 µF 1/4 10+100% 25V |
| C107 | | | |
| C108 | 4100230 1.5 nF 2.5% 63V | C211 | 4200480 22 µF 20% 10V |
| C109 | 4100279 2 nF 2.5% 63V | | |

| | | | |
|---|---|---|---|
| L1- L2 | 8020565 2.2 µH | L3 | 8020639 100 µH |

| | | | |
|---|---|---|---|
| X1- X2 | 8090009 6.0 MHz | X3 | 8090058 11.2896 MHz |

| | | | |
|---|---|---|---|
| P2 | 7220574 Plug 3 pol | P6 | 7220582 Plug 14 pol |
| P3 | 7220312 Plug 2 pol | P7 | 7220471 Plug 7 pol |
| P4 | 7220313 Plug 3 pol | P8 | 7220312 Plug 2 pol |
| P5 | 7220583 Plug 5 pol | P10 | 7220584 Plug 8 pol |

**PCB 6, 8005221**
**Motor**

| | | | |
|---|---|---|---|
| C1 | 4010107 22 nF -20-80% 40V | | |

| | | | |
|---|---|---|---|
| To P3 | 6275715 Wire w/sockets 2/2 pin | | |

**PCB 7, 8005219**
**Optocoupler**

| | | | |
|---|---|---|---|
| To P2 | 6275744 Wire w/sokets 3/3 pin | | |

| | | | |
|---|---|---|---|
| PE201 | 8330196 Optocupler | | |

**PCB 8, 8005169**
**Mains Transformer**

| | | | |
|---|---|---|---|
| P1 | 7220584 Plug 8 pol | | |

| | | | |
|---|---|---|---|
| TF1 | 6609029 Thermal fuse 130° C | | |

| | | | |
|---|---|---|---|
| | 6275755 Audio wire bundle | | |

**PCB 9, 8005223**
**Socket panel**

| | | | |
|---|---|---|---|
| C1- C2 | 4010103 2.2 nF 10% 63V | C3 | 4010128 470 pF 10% 63V |

| | | | |
|---|---|---|---|
| | 7210384 Phono Socket (female) | | |

**PCB 10, 8005223**
**Din socket**

| | | | |
|---|---|---|---|
| | 7210600 DIN socket (female) 7 pol | | |

**PCB 11, 8005222**
**PCB f. Flex Print**

| | | | |
|---|---|---|---|
| P12- P13 | 7210614 Socket 14 pol. | | |

**PCB 30, 8005204**
**Servo**

| | | | |
|---|---|---|---|
| IC6101 | 8340991 **125** TDA 5708 C3 | IC6103 | 8340993 **103** NJM 4560D |
| IC6102 | 8340992 **134** TDA 5709 | IC6104 | 8340683 **103** L 272BH |

| | | | |
|---|---|---|---|
| TR5108 | 8320721 **020** BC 338-16 | TR6112 | 8320616 **051** BC 858B |
| TR5109 | 8320615 **051** BC 848B | | |

209

| | | | |
|---|---|---|---|
| D6107 | 8300058 **209** 1N 4148 | D6118- | 8300570 **209** HZ 7C2 7V5 |
| D6110- | 8300058 **209** 1N 4148 | D6119 | |
| D6111 | | | |

| | | | |
|---|---|---|---|
| R3101 | 5020966 12 Ω 5% 1/3W | R3151 | 5011254 82 kΩ 2% 1/8W |
| R3102 | 5011234 4.7 kΩ 2% 1/8W | R3152 | 5011314 39 kΩ 5% 1/8W |
| R3103 | 5011256 100 kΩ 2% 1/8W | R3154 | 5011491 39 kΩ 2% 1/8W |
| R3104 | 5020967 18 Ω 5% 1/3W | R3155 | 5011241 10 kΩ 2% 1/8W |
| R3105 | 5011218 100 Ω 2% 1/8W | R3156- | 5011245 22 kΩ 2% 1/8W |
| R3106 | 5370355 1 kΩ 20% | R3157 | |
| R3107- | 5020965 4.7 Ω 2% 1/3W | R3158 | 5011233 39 kΩ 2% 1/8W |
| R3108 | | R3159 | 5010547 18 kΩ 2% 1/4W |
| R3109 | 5011244 18 kΩ 2% 1/8W | R3160 | 5020971 4.7 Ω 1% 1/4W |
| R3110 | 5011490 12 kΩ 2% 1/8W | R3161 | 5011490 12 kΩ 2% 1/8W |
| R3111 | 5011230 2.2 kΩ 2% 1/8W | R3162 | 5011254 82 kΩ 2% 1/8W |
| R3112 | 5011267 1 mΩ 2% 1/8W | R3163 | 5010056 82 Ω 5% 1/4W |
| R3113 | 5011218 100 Ω 2% 1/8W | R3166 | 5011250 47 kΩ 2% 1/8W |
| R3114 | 5011238 6.8 kΩ 2% 1/8W | R3167 | 5011490 12 kΩ 2% 1/8W |
| R3115 | 5011319 680 kΩ 5% 1/8W | R3191 | 5011241 10 kΩ 2% 1/8W |
| R3116 | 5011218 100 Ω 2% 1/8W | R3192- | 5011245 22 kΩ 2% 1/8W |
| R3135 | 5011586 11 kΩ 2% 1/8W | R3193 | |
| R3136 | 5011259 150 kΩ 2% 1/8W | R3201 | 5011254 82 kΩ 2% 1/8W |
| R3137 | 5011257 120 kΩ 2% 1/8W | R3202 | 5011250 47 kΩ 2% 1/8W |
| R3138 | 5020964 1.0 Ω 2% 1/3W | R3204 | 5011238 6.8 kΩ 2% 1/8W |
| R3139 | 5011254 82 kΩ 2% 1/8W | R3205 | 5011254 82 kΩ 2% 1/8W |
| R3140 | 5020964 1.0 Ω 2% 1/3W | R3206 | 5011255 91 kΩ 2% 1/8W |
| R3141 | 5011587 160 kΩ 2% | R3207 | 5020263 100 kΩ 1% 1/4W |
| R3143 | 5011269 47 Ω 2% 1/8W | R3208 | 5020969 47 kΩ 1% 1/4W |
| R3144 | 5011255 91 kΩ 2% 1/8W | R3209 | 5011234 4.7 kΩ 2% 1/8W |
| R3145 | 5011318 390 kΩ 5% 1/8W | R3210- | 5020964 1.0 Ω 2% 1/3W |
| R3146 | 5370254 22 kΩ 20% o.1W | R3211 | |
| R3150 | 5011491 39 kΩ 2% 1/8W | | |

| | | | |
|---|---|---|---|
| C2101 | 4000255 22 nF 10% 50V | C2139 | 4000255 22 nF 10% 50V |
| C2102 | 4000249 470 pF 5% 50V | C2140 | 4200745 220 mF 16V |
| C2103 | 4200414 33 mF -10+50% 16V | C2141 | 4130245 220 nF 5% 63V |
| C2104 | 4200482 47 mF 20% 10V | C2142 | 4000256 100 nf 10% 50V |
| C2105- | 4000255 22 nF 10% 50V | C2150- | 4130424 3.6 nF 160V 1% |
| C2106 | | C2151 | |
| C2107 | 4200482 47 mF 20% 10V | C2152 | 4130206 220 nF 10% 100V |
| C2108 | 4000254 10 nF 10% 50V | C2153 | 4130314 180 nF 10% 63V |
| C2109 | 4130379 270 nF 5% 63V | C2154 | 4130206 220 nF 10% 100V |
| C2110 | 4000253 5.6 nF 10% 50V | C2155 | 4130405 470 nF 10% 50V |
| C2111 | 4130405 470 nF 10% 50V | C2156 | 4130338 6.8 nF 5% 100V |
| C2112 | 4130406 150 nF 5% 50V | C2159 | 4130293 470 nF 10% 63V |
| C2113 | 4000248 100 pF 5% 50V | C2160 | 4010173 4.7 nF 10% 50V |
| C2114 | 4000233 220 pF 5% 50V | C2200 | 4010173 4.7 nF 10% 50V |
| C2117 | 4010173 4.7 nF 10% 50V | C2202 | 4130405 470 nF 10% 50V |
| C2135 | 4130370 4.7 nF 5% | C2203 | 4130221 18 nF 5% 63V |
| C2136 | 4130405 470 nF 10% 50V | C2204- | 4000255 22 nF 10% 50V |
| C2137 | 4000255 22 nF 10% 50V | C2205 | |
| C2138 | 4200745 220 mF 16V | | |

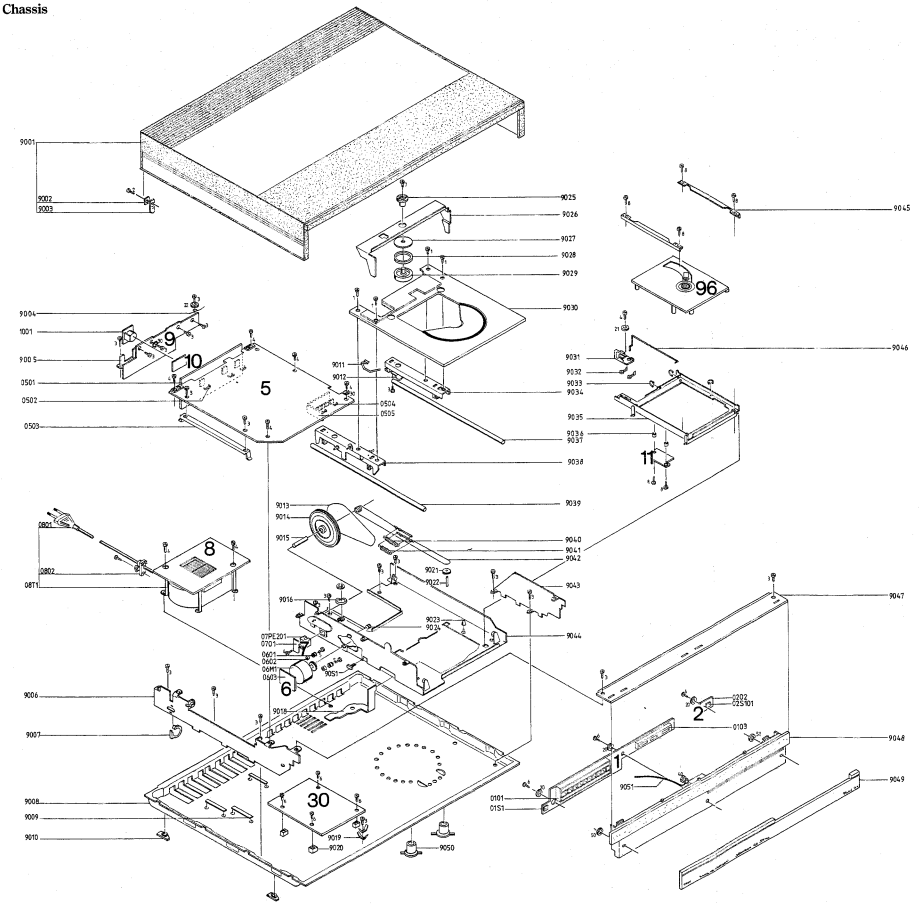
| | | | |
|---|---|---|---|
| P31 | 7210614 Socket 14 pol | P34 | 7220657 Plug 14 pol |
| P33 | 7220652 Plug 5 pol | P36 | 7220651 Plug 4 pol |

| | | | |
|---|---|---|---|
| To P5 | 6275746 Wire w/sokets 5/5 pin | To P6 | 6275745 Wire w/sokets 14/14 pin |

△ betyder at statisk elektricitet kan ødelægge komponenten.
△ indicates that static electricity may destroy the component.
△ bedeutet, daß statische Elektrizität die Komponente zerstören kann.
△ signifi que électricité statique peut détruire le composant.
* Speciel udvalgt eller bearbejdet eksemplar.
* Specially selected or adapted sample.
* Speziell ausgewähltes und bearbeitets Exemplar.
* Exemplaire, spécialement sélectionné et façonne.

MECHANICAL PARTSLIST

## Chassis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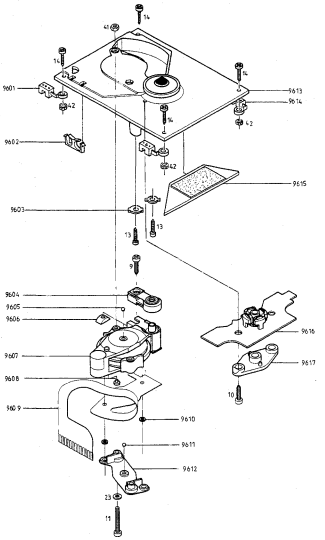
4-2




| | | | | | |
|---|---|---|---|---|---|
| | 9601 | 3333016 | Rubber holders | 9610 | 2622426 | Washer f. foil |
| | 9602 | 3152593 | Clamp f. flexprint | 9611 | 2917024 | Ball |
| | 9603 | 3034077 | Transport screw | 9612 | 2905116 | Pivot plate |
| □ | 9604 | 8330210 | Focusunit | 9614 | 3333015 | Rubber holders |
| | 9605 | 2917024 | Ball | 9615 | 3342046 | Weighing block |
| | 9606 | 2389077 | Spec. nut | | | The disc motor system pos. |
| ○ | 9607△ | 3131296 | Rafoc | | | no. 9613, 9616 and 9617 are |
| | 9608 | 3010031 | Rubber stop | | | one unit, part no. 3114292 |
| | 9609 | 6141131 | Flex print | | | |

□ Replacement of 9604 see page 5-5, 5-9
○ Replacement of 9607 see page 5-4, 5-5, 5-12

**Screws, washers, etc.**

| | | | | | |
|---|---|---|---|---|---|
| 1 | 2038097 | Screw M3x6 mm | 13 | 2013145 | Screw 3 x 12 mm |
| 2 | 2043016 | Screw AM 4x10 mm | 14 | 2034064 | Screw 2 x 10 mm |
| 3 | 2038096 | Screw M3x5 mm | 20 | 2622052 | Washer 3.2x8x1 mm |
| 4 | 2038098 | Screw M3x8 mm | 21 | 2622348 | Washer 2.3 mm |
| 5 | 2036016 | Screw AM 2.6x6 mm | 22 | 2622321 | Washer 3.2 mm |
| 6 | 2013136 | Screw 3x6 mm | 23 | 2624013 | Washer 3 mm |
| 7 | 2013137 | Screw 3x10 mm | 30 | 2625002 | Tooth lock washer 3.2 |
| 8 | 2038103 | Screw AM 3x12 mm | 40 | 2380011 | Nut M3 |
| 9 | 2011038 | Screw 2.2x10 mm | 41 | 2380012 | Nut M3 |
| 10 | 2013149 | Screw 2.9x16 mm | 42 | 2380147 | Nut M3 |
| 11 | 2038120 | Screw 3x25 mm | 50 | 2390001 | Spring washer 2.3 DIN |
| 12 | 2013094 | Screw M 2.9x6.5 mm | 51 | 2390103 | Spring washer Ø2x0.25 |

4-2



**Parts not shown**

| | | | |
|---|---|---|---|
| 7500157 | Crimp f. wire | 3629104 | Screw driver T20 |
| 3391251 | Outer carton | 3634030 | Glass disc |
| 3391997 | Insert for packing | 3634031 | Test disc 5 and 5A |
| 3397571 | Foam packing, set | 3634032 | Magnet ring |
| 3946048 | Foil | 3505479 | Owner's Manual DK |
| 6270213 | Signal cable 7 pol. | 3505480 | Owner's Manual S |
| 3629107 | Blade T6 short | 3505481 | Owner's Manual SF |
| 3629037 | Blade T8 short | 3505482 | Owner's Manual GB |
| 3629102 | Blade T10 long | 3505483 | Owner's Manual D |
| 3629038 | Blade T10 short | 3505484 | Owner's Manual NL |
| 3629103 | Blade T20 short | 3505485 | Owner's Manual F |
| 3629109 | Screw driver T6 | 3505486 | Owner's Manual I |
| 3629108 | Screw driver T8 | 3505487 | Owner's Manual USA |
| 3629047 | Screw driver T10 | | |

## MEKANISKE JUSTERINGER

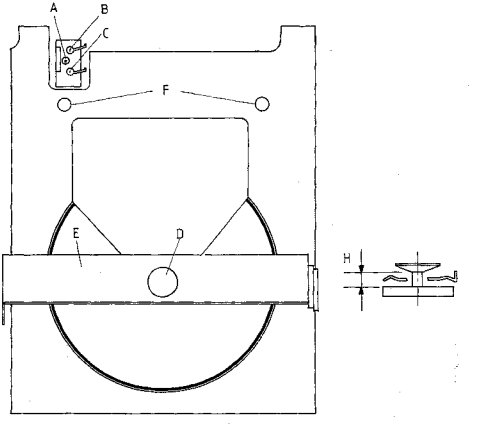
### Højde på løbeværket

Justeringen foretages med de 4 skruer i gummidæmperne i hjørnerne på løbeværket. De 2 bageste skruer kan justeres gennem hullerne F i pladeskuffen når skuffen er inde, og de 2 forreste når skuffen er næsten ude. Der bør justeres lige meget og i samme retning på alle 4 skruer. For at nå de 2 forreste skruer skal den lange vinkel over fronten tages af, og for at lette justeringen vippes fronten ned.

Læg CD-plade i og tryk pladeskuffen ind.

Juster de 4 nævnte skruer til CD-pladens underkant er 0,3 mm ± 0,3 mm over pladeskuffens overkant når pladeskuffen er inde.

### Centrering af løbeværk




Læg en CD-plade i og tryk pladeskuffen ind.

Skruen A løsnes.

Ekscentrik B justeres til CD pladen er midt i fordybningen i pladeskuffen.

Skruen A spændes.

## MECHANICAL ADJUSTMENTS

### Height of drive mechanism

Make the adjustment with the 4 screws in the rubber dampers at the corners of the drive mechanism. The 2 rearmost screws may be adjusted through the holes F in the disc drawer when the drawer is in, and the 2 frontmost screws may be adjusted when the drawer is almost out. All 4 screws should be adjusted identically. In order to reach the 2 frontmost screws, the long bracket at the top of the front should be removed, and the front should be tilted down to facilitate the adjustment.

Insert a CD and push in the disc drawer.

Adjust the 4 screws mentioned until the lower edge of the CD is 0.3 mm ± 0.3 mm above the upper edge of the disc drawer when the disc drawer is in.

### Centring of drive mechanism

Load a CD and push the disc drawer in.

Loosen screw A.

Using eccentric B, adjust until the CD is at the centre of the depression in the disc drawer.

Tighten screw A.

**Centrering af vinkel for pladeholdermagnet**
Pladeskuffen trykkes ind.

Skruen A skal være løsnet.

Ekscentrik C justeres til pladeholdermagneten D ligger midt i hullet i vinklen E.

Skruen A spændes.

**Højde af vinkel for pladeholdermagnet**
Læg en CD plade og tryk pladeskuffen ind.

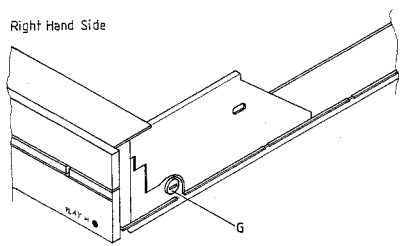
**Centring of bracket for disc clamping magnet**
Push in the disc drawer.

Screw A must be loosened.

Using eccentric C, adjust until the disc clamping magnet D is at the centre of the hole in the bracket E.

Tighten screw A.

**Height of bracket for disc clamping magnet**
Insert a CD and push in the disc drawer.




Skruen G justeres til højden af vinklen E ligger midt i frigangen H på plademagneten D.

Kontroller at pladeholdermagneten ikke går imod metalpladen, som er limet på den bageste del af pladeskuffen, når skuffen trækkes ud og ind.

**Stop position for pladeskuffe**
Pladeskuffen skal være trykket helt ind.

Medens skuffen trykkes ind mod stop, justeres unbrakoskruen (5 mm) under bunden, indtil skuffeforkanten flugter med fronten på apparatet.

**Højde pladeskuffe forkant**
Pladeskuffen trykkes ind.

De 2 skruer under den forreste del af bunden justeres til overkanten af pladeskuffen flugter med overkanten af aluminiumslisten på fronten.

By means of screw G, adjust until the height of the bracket E is at the centre of the clearance H between the bracket and the disc magnet D.

Make sure that the disc clamping magnet does not hit the metal sheet which is glued onto the rearmost part of the disc drawer when the drawer is pulled out and pushed in.

**Stop position for disc drawer**
The disc drawer must be fully depressed.

While the drawer is pressed against stop, adjust the allen screw (5 mm) in the bottom until the front edge of the drawer is flush with the front of the set.

**Height of front edge of disc drawer**
Push in the disc drawer.

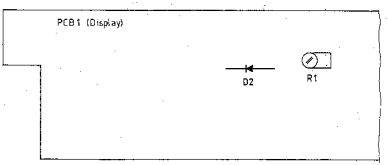
By means of the 2 screws under the front part of the bottom, adjust until the upper edge of the disc drawer is flush with the upper edge of the aluminium strip on the front.

ELEKTRISKE JUSTERINGER

**Lysintensitet (Brightness)**

ELECTRIC ADJUSTMENTS

**Brightness**




1D2 loddes fri og løftes i den ene ende.

Milliamperemeter sættes ind i serie med 1D2.

Ilæg en CD plade med mere end 15 numre.

Tryk PLAY.

1R1 justeres til der måles 153 mA ±5 mA.

Unsolder 1D2 and elevate it at one end.

Connect a milliammeter in series with 1D2.

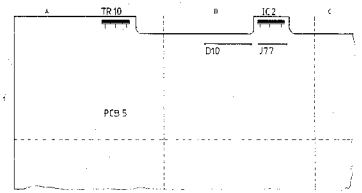
Insert a CD with more than 15 tracks.

Press PLAY.

Adjust 1R1 until a measurement of 153mA ±5mA is obtained.

**+5V strømforsyning**

**+5V power supply**




Ilæg en CD plade og tryk PLAY.

Mål DC spændingen fra ben 20 til ben 40 på 5IC7. (SAA 7210).

NB! Der skal måles direkte på IC'en.

5D10 skal være kortsluttet (5J77).

Hvis den målte spænding er lavere end 4,85 V skal 5J77 afbrydes.

Load a CD and press PLAY.

Measure the DC voltage from pin 20 to pin 40 of 5IC7 (SAA 7210).

NOTE: The measurement must be made on the IC directly.

5D10 must be short-circuited (5J77).

If the measured voltage is less than 4.85V, 5J77 has to be disconnected.

**KONTROL, REPARATION OG JUSTERING AF CD LØBEVÆRK**

For at forhindre metalsplinter i at komme ned i løbeværket, er det nødvendigt at reparationspladsen er helt ren.

PHOTODIODERNE OG LASEREN ER MERE FØLSOMME OVERFOR STATISK EL END MOS IC'er. UFORSIGTIG BEHANDLING UNDER SERVICE KAN REDUCERE LEVETIDEN DRASTISK. DERFOR SKAL DET SIKRES AT ARBEJDSPLADSEN ER BESKYTTET MOD STATISK EL.

Ved reparation af løbeværket skal der udvises forsigtighed for at undgå beskadigelse af focus bladfjederen.

**Servicering af RAFOC enheden (= Radial og Focus enhed, pos. nr. 9607, se exploded view).**

Tag CD løbeværket ud af apparatet.

RAFOC enheden kan tages ud ved at løsne de 2 stk. 2,9 x 16 mm fastspændingsskruer.

Bemærk: Når de nævnte skruer løsnes, er de 2 møtrikker på oversiden af løbeværket løse. Armlejet pos. 9612 trækkes ud, og RAFOC enheden med det fleksible print kan nu tages ud.

BEMÆRK! Ved montering af RAFOC enheden, er det meget vigtigt, at det fleksible print ligger helt op mod topchassiset på CD løbeværket, der hvor holder pos. 9602 skal holde printet fast. For at forhindre at RAFOC enheden kan gå imod det fleksible print, kan det være nødvendigt at lime printet fast mod topchassiset med hurtig tørrende lim. Dette skal dog gøres meget forsigtigt.
Hvis laser eller monitor diode er defekt, er det nødvendigt at skifte RAFOC enheden pos. 9607. Efter montering af RAFOC enheden skal det sikres, at enheden kan bevæges helt frit gennem hele vandringen.
Dette kan kontrolleres med en trykfjedermåler, som holdes imod magneten på fokusenheden. Friktionen skal være under 25 mN gennem enhedens hele vandring.

**CHECK, REPAIR AND ADJUSTMENT OF THE CD MECHANISM**

To prevent loose metal objects from getting in the CD mechanism, it will be necessary to see to a clean repair station.

THE PHOTODIODES AND THE LASER ARE MORE SENSITIVE TO ELECTROSTATIC DISCHARGES THAN MOS ICS.
CARELESS HANDLING DURING SERVICING MAY REDUCE LIFE EXPECTATION DRASTICALLY. THEREFORE, CARE SHOULD BE TAKEN, THAT THE REPAIR STATION IS PROTECTED AGAINST STATIC ELECTRICITY.

When effecting repairs to, or making measurements on the CD mechanism, be careful not to damage the flat springs of the focusing unit.

**Servicing the RAFOC unit (= Radial and Focusing unit, pos. 9607. See exploded view).**

Take the CD mechanism out of the set.

The RAFOC unit can be removed after the two fixing screws 2.9 x 16 mm have been loosened.

Caution: when doing so, the two nuts M3 on the upper side of the CD mechanism come loose. Now the pivot plate pos. 9612 can be removed. After removing the clamping piece, pos. 9602 the RAFOC unit/flexible PCB assembly can be taken out.

ATTENTION: When mounting the RAFOC unit, see to it that the flexible PCB rest well against the mounting plate at the height of the clamping piece (pos. 9602). In some cases, after exchanging the RAFOC unit/flexible PCB assembly, it may be necessary to glue the flexible PCB with a fast-drying glue to prevent the RAFOC unit from rubbing against the flexible PCB.
The gluing should be done very carefully.
When the laser and/or the monitor diodes are defective, it will be necessary to replace the RAFOC unit, pos. 9607.
After mounting the RAFOC unit you should make sure that the arm runs clear over the entire disc diameter.
This can be checked by means of a spring-pressure gauge which is held against the magnet of the focusing unit. The friction of the arm, measured over the entire meter reading, may not be greater than 25 mN.

En hurtig kontrol af RAFOC enhedens frigang kan gøres i service position 1, hvor enheden kan bevæges gennem hele vandringen med OPEN og PLAY tasterne. (Se reparationstips side 7.1).
Efter montering af RAFOC enheden skal laserarmens vinkelindstilling kontrolleres. Playability efter montering af RAFOC enheden kan afprøves med testplade 5A.

**Udskiftning af servo PCB30, RAFOC enhed pos. nr. 9607 eller focus enhed pos. nr. 9604**
(Kun i apparater med 1 potentiometer på PCB30).

Ved udskiftning af en af de nævnte dele, skal følgende kontrolleres:
Tilslut DC voltmeter med + til 30P31 ben 13 og - til 30P31 ben 14 (stel).

Hvis der er monteret en 820 kohms modstand fra ben 8 på 30IC6104 til -6 Va, afmonteres denne.

CD løbeværket skal stå helt vandret.

Ilæg testplade 5A (bestillingsnr. 3634031). Sæt apparatet i servicepoition. (Kortslut servicestikket på PCB5 samtidig med at netstikket sættes i).
Tryk derefter OPEN og PLAY samtidigt 3 gange.

Hvis spænding overstiger +165 mV monteres 820 kohms modstanden fra ben 8 på 30IC6104 til -6 Va.

**Justering af Focus offset (er ikke muligt i de først producerede apparater).**

Ilæg testplade 5A (bestillingsnr. 3634031).

Sæt apparatet i serviceposition 2 ved at kortslutte servicestikket på PCB5 samtidig med at netstikket sættes i.

Tryk derefter »OPEN« og »PLAY« samtidigt og 2 gange.

Hvis »2« i displayet bliver ved med at blinke, justeres 30R3146 til »2« lyser konstant.

Sæt apparatet i serviceposition 4 ved at trykke »OPEN« og »PLAY« samtidigt og 2 gange (»4« i displayet skal lyse, og pladen skal rotere).

Tilslut DC voltmeter over 30C2136.

Juster 30R3146 til der måles 400 mV ±40 mV.

A fast check of the clearance of the arm is possible in service position 1. The RAFOC unit can be moved across the diameter of the disc by operating the OPEN and PLAY keys. (See repair hints page 7.1).
After mounting the RAFOC unit the angle setting of the laser arm should be checked.
Playability after mounting the RAFOC unit can be checked using test disc 5A.

**Replacing the servo PCB30, RAFOC unit pos. no. 9607 or focusing unit pos. no. 9604**
(Only in a CD with a potentiometer on PCB30).

When replacing one of the mentioned parts, the following shall be checked:
Connect DC voltmeter with + to 30P31 pin 13 and - to 30P31 pin 14 (ground).

If a resistor of 820 kohms is mounted from pin 8 of 30IC6104 to -6 Va, this should be dismounted.

The CD mechanism must be placed completely horizontally.

Put test disc 5A (part no. 3634031) on the turntable. Put the player in service position. (Short circuit the service plug on PCB5 and plug into mains supply at the same time).
Then press OPEN and PLAY simultaneously and 3 times.

If the voltage measured, exceeds +165 mV, the resistor of 820 kohms shall be mounted from pin 8 of 30IC6104 to -6 Va.

**Adjustment of DC focus offset (not possible in the first productions of the unit).**

Load test disc 5A (order no. 3634031).

Set unit to service position 2 by short-circuiting the service point on PCB5 while inserting the mains plug.

Then press "OPEN" and "PLAY" simultaneously twice.

If "2" on the display keeps flashing, adjust 30R3146 until "2" light constantly.

Set the unit to service position 4 by pressing "OPEN" and "PLAY" simultaneously twice. ("4" on the display should light and the disc rotate).

Connect DC voltmeter across 30R2136.

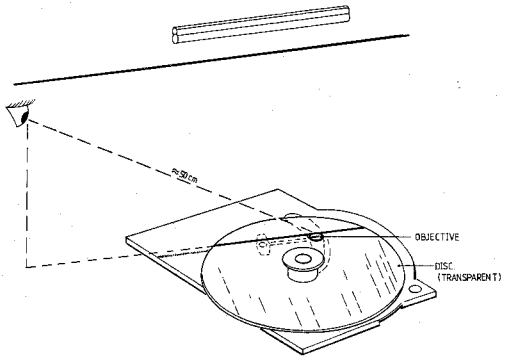
Adjust 30R3146 until the reading is 400 mV ±40 mV.

**Kontrol af vinkel indstilling på laserarm**

Vinkel indstillingen kan kontrolleres efter glaspladem-etoden, som er forklaret i det efterfølgende.

**Checking the angle setting**

The angle setting can be checked with the glass-disc method which is explained below.




Læg glasplade (bestillingsnr. 3634030) på pladeholderen. Glaspladen skal hvile jævnt mod pladeholderen.

Put glass disc part no. 3634030 on the turntable. Male sure that the glass disc beds down well on the turntable.

Placer CD løbeværket under en lyskilde hvorunder der er en lige linie (f.eks. et lysstofrør med gitter). Afstanden mellem løbeværket og lyskilden skal være større end 1,5 m.

Place the CD mechanism under a light source, under which there is a straight line (e.g. under a fluorescent tube with grid).
The distance between the CD mechanism and the light source should be more than 1.5 m.

Placer laserarmen midt i dens radiale vandring.

Set the arm to mid-position of its radial track.

Drej løbeværket indtil laserarmen er parallel med linien fra lyskilden.

Turn the mechanism until the arm is parallel to the line under the light source (see figure below).

Se i forlængelse af den reflekterede linie på henholdsvis glasplade og optik. Der må ikke være mere end 4 mm afstand mellem de 2 linier.

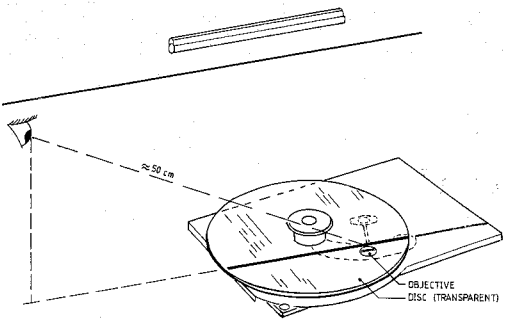
Look into the direction and in the extension of the line to the reflection there of on the glass disc and in the objective. These lines should not be apart more than 4 mm.

Placer CD løbeværket sådan at linien der reflekteres af optikket løber gennem optikkets centrum.

Place the CD mechanism so that the reflected line runs across the centre of the objective.

Hvis linien der reflekteres af glaspladen er indenfor optikkets overfalde, er vinkel indstillingen i orden.

When the line that is reflected by the glass disc stays within the surface of the objective, the angle setting is correct.




Drej CD løbeværket 90° i forhold til forrige position.

Hold laserarmen i midterposition.

Gentag ovenstående kontrol.

**Justering af vinkel indstilling**

Hvis kontrol af vinkel indstilling viser, at vinklen er udenfor tolerance, skal den *ikke* justeres til minimum afvigelse men blot indenfor tolerance.

Efter justering af vinkel indstilling, skal laserarmens friktion kontrolleres. Dette kan gøres med en tryk-fjedermåler, som holdes mod magneten på focus-enheden.

Friktionen skal være under 25 mN gennem enhedens hele vandring.

Hvis friktionen er for høj skal RAFOC enheden udskiftes og vinkel indstillingen skal kontrolleres igen.

Turn the CD mechanism through 90° relative to the previous position.

The arm must be kept in mid-position (see figure above).

Repeat the previous check.

**Adjusting the angle setting**

If a check on the angle setting shows that the angle falls outside the toelerance, the angle should *not* be adjusted for minimum deviation, but it should be adjusted within the tolerance.

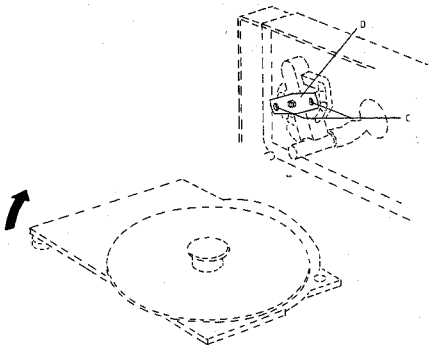
After adjusting the setting, the friction of the arm must be checked. This is done by means of a spring pressure gauge which is held against the magnet of the focusing unit.

The friction of the arm, measured over the entire meter reading, should not be greater than 25 mN.

When the friction appears to be too high, the RAFOC unit must be replaced and the angle setting shall be checked once more.

**Justering af vinkel indstilling gøres som beskrevet i det efterfølgende:**

**Adjustment of the angle setting is performed as follows:**




Skruerne C løsnes indtil armlejet D kan forskubbes. Vinkelindstillingen justeres ved at skubbe armlejet D som vist på nedenstående tegning.

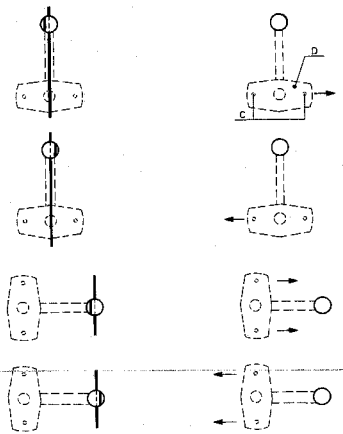
Loosen screws C (see figure above) until bearing plate D can be displaced. Correct the angle setting by moving the bearing plate into the direction shown in figure below.

Skruerne C spændes medens det sikres at indstillingen ikke flytter sig.

Tighten screws C, ensuring that the setting does not drift.

Foretag kontrol af vinkelindstilling.

Then double check the setting in two directions.



**Udskiftning af fleks PCB pos. 9609**
Afmonter RAFOC enheden.

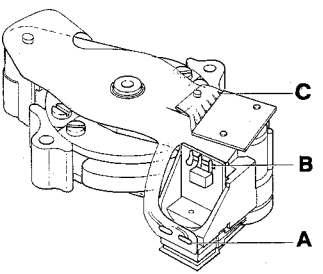
De 2 tilslutninger A kan nu loddes fra, og før tilslutningerne C loddes fra, skal placeringen af fleks-PCB'en markeres på fotodiode PCB'en.

Dette gøres ved hjælp af en blyant, så den nye fleks-PCB kan placeres i nøjagtig samme position.

**Replaceing the flexible PCB pos. 9609**
Demount the RAFOC unit.

Desolder the connections A of the flexible PCB.

Before desoldering the connections C of the photodiode PCB, the position of the connecting points of the photodiode PCB should be marked, so that afterwards the PCB can correctly be replaced.




Fralodningen af de 6 tilslutninger C skal gøres ved at varme hver enkelt tilslutning op og løsne forbindelsen med feks. bagkanten af et skalpelblad.
N.B. Dette skal gøres med stor forsigtighed.
Herefter fraloddes de 4 tilslutninger til radial spolerne inden de 3 tilslutninger (B) til laser PCB'en loddes fra.

PCB'en kan nu løftes af, og inden den nye PCB monteres, loddes et lille lag loddetin på tilslutningerne C.

Den nye fleks-PCB placeres nu korrekt iflg. blyantsmærkerne og tilslutningerne til de radiale spoler loddes nu fast inden tilslutningerne A og B.

PCB'en placeres på plads under fotodioden PBC'en, og hver enkelt tilslutning varmes let op med en loddekoble, til lodningerne løber sammen.

For montering af RAFOC enheden, se afsnittet om servicering af RAFOC enhed.

Now the 6 connections C of the photodiode PCB can be desoldered by heating the pins C one by one until the flexible PCB comes loose.
This should be done very carefully.
Desolder the 4 connections of the radial coils.
Unsolder the 3 connections (B) of the laser PCB.

The PCB can now be taken off, and before the new PCB is mounted, the connections C should be provided with a small coating of tin.

The new PCB is now placed according to the marks on the photodiode PCB, and the 4 connections of the radial coils are soldered before the connections A and B.

Now the PCB is placed correct below the photodiode PCB, and the 6 connections C can now be heated so that they become soldered to the photodiode PCB.

For mounting the RAFOC unit, see section concerning servicing the REFOC unit.

**Udskiftning af focus enhed pos. 9604**
De 2 tilslutninger fra fleks PCB'en til focus enheden loddes fra.

Skruen der holder focus enheden skrues ud. Bemærk, gevindstykket (pos. 9606) vil gå løs.

Focus enheden kan nu tages af.

Ved montering af ny focus enhed er placeringen fikseret, og justering er ikke mulig.

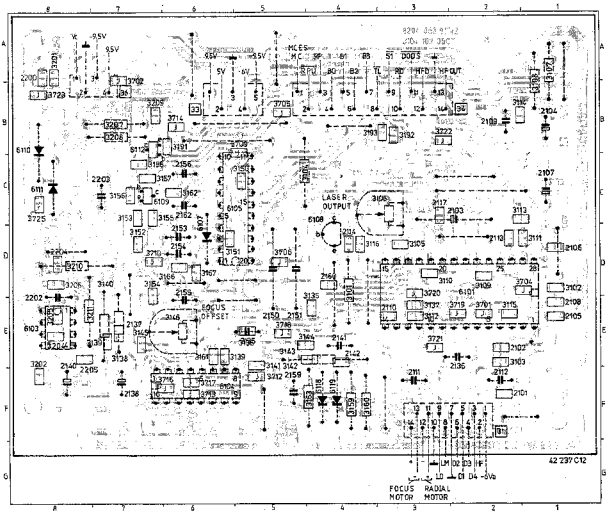
**Replacing the focusing unit pos. 9604**
Desolder the 2 connections of the flex PCB on the focusing unit.

Remove the screw fastening the focusing unit. As a result the fixing piece (pos. 9606) will come loose.

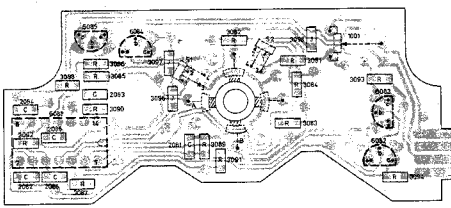
The focusing unit can now be removed.

When mounting the new focusing unit the position is fixed, adjustments are not possible.

**SERVO PCB 30**




**DISC MOTOR CONTROL**



**Kontrol af laserforsyning**

Laseren, laserforsyningen i 30IC6101 og monitordioden danner et tilbagekoblings system. En fejl i laserforsyningen kan medføre at laseren ødelægges.
Hvis dette er tilfældet, og laseren (= komplet RAFOC enhed) udskiftes, vil den nye laser også ødelægges.

Da det er umuligt at kontrollere og reparere et tilbagekoblingssystem hvor en af komponenterne mangler, kan nedenstående kredsløb bruges til at kontrollere laserforsyningen.

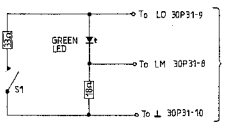
Den grønne LED udgør laseren. Spændingen over 18 ohms modstanden udgør monitor tilbagekoblings spændingen. 33 ohms modstanden og omskifteren gør det muligt at ændre strømforbruget fra laserforsyningen.

**Check of laser supply**

The laser and the laser supply in 30IC6101 plus the monitor diode form a feedback system. A defect in the laser supply may result in the destruction of the laser.
If, in that case, the laser (= complete RAFOC unit pos. no. 9607) is replaced, the new laser will also become defective.

However, it is impossible to check and repair a feedback system if a link is missing. For this reason the laser supply can be checked with the circuit below.

The green LED replaces the laser, the voltage across the 18-Ohm resistor is fed back as monitor voltage, the 33-Ohm resistor and the switch serve to draw more current from the laser supply.




Grøn LED f.eks. CQY94 bestillings. nr. 8330054.

Fleks printet tages ud af P31 på servo PCB'en.

Ovenstående kredsløb loddes på P31 på servo PCB'en.

$\overline{SI}$ (ben 20 på 30IC6101) kortsluttes til stel.

Når $\overline{SI}$ (Start initialization) er low, kan laserforsyningen tændes i service position 1. Sæt apparatet i serviceposition 1. (Kortslut service stikket på PCB5 samtidig med at netstikket sættes i).
Tryk derefter OPEN og PLAY samtidigt.

LO spændingen på 30P31 ben 9 måles.

S1 afbrudt: LO fra 1,8 V til 2,3 V
LM fra 170 mV til 220 mV
Den grønne lysdiode lyser svagt.

S1 kortsluttet: LO fra 1,8 V til 2,3 V
LM fra 170 mV til 220 mV
Den grønne lysdiode lyser svagt.

Når S1 skiftes fra kortsluttet til afbrudt vil LED'en lyse kraftigere i et kort øjeblik. Tilbagekoblingssystemet bevirker at der går samme strøm i LED hvadenten S1 er kortsluttet eller afbrudt.

LED green e.g. CQY94 part no. 8330054.

Take the flex PCB out of P31 on the servo PCB.

Connect above mentioned circuit to P31 on the servo PCB.

Connect $\overline{SI}$ (pin 20 of 30IC6101) to ground.

With $\overline{SI}$ (start initialization) low, the laser supply can be switched on. Put the player in service position 1. (Short circuit the service plug on PCB5 and plug into mains supply at the same time).
Then press OPEN and PLAY simultaneously.

Measure the voltage LO at 30P31 pin 9.

S1 open: LO from 1.8 V til 2.3 V
LM from 170 mV to 220 mV
The green LED emits little light.

S1 closed: LO from 1.8 V to 2.3 V
LM from 170 mV to 220 V
The green LED emits little light.

During the change over from S1 closed to S1 open, the LED will emit more light for a short moment. The control sees to it that the same amount of current flows through the LED when S1 is open and when S1 is closed.

**Justering af laserstrøm**

Bemærk! Ved udskiftning af RAFOC enheden (pos. nr. 9607) skal laser current potentiometeret (pos. nr. 30R3106) stilles i mekanisk midt position for at undgå beskadigelse af laseren.

Tilslut DC voltmeter over 30R3102.

Ilæg testplade nr. 5 (plade uden fejl, bestillingsnr. 3634031).

Sæt apparatet i serviceposition 2. (Kortslut servicestikket på PCB5 samtidig med at netstikket sættes i). Tryk derefter OPEN og PLAY samtidigt 2 gange.

Juster 30R3106 indtil spændingen over 30R3102 er ca. 40 mV.
(Spændingen varierer hvis pladen roteres).

Gå ud af serviceposition 2 ved at afbryde netspændingen kortvarigt.

Afspil spor 1 på testplade 5.

30R3106 justeres indtil spændingen over 30R3102 er 50 mV ±5 mV.

**Kontrol af disc motor systemet**

1. Afbryd Vc forbindelsen ved at lodde 30D6110 og 30D6111 fra.

2. Tilslut den ene kanal på et dobbelt strålet oscilloskop til emitteren på 96TR6082, og den anden kanal til emitteren på 96TR6084. Indstil oscilloskopet til 2V – 10 mS.

3. Sæt apparatet i serviceposition 1. (Kortslut service stikket på PCB5 samtidig med at netstikket sættes i).
   Tryk derefter OPEN og PLAY samtidigt.

4. Tilslut en negativ DC spændingsforsyning (V-in) til 30P36-1. NB! Apparatet *skal* stå i service position 1 (strømforsyningen i apparatet skal være tændt) når dette gøres.

   Start fra 0 V og reguler DC forsyningen mod – indtil motoren kører (max. -5 V).

   Når motoren kører, ændres spændingen til -1,5 V.

   Motoren skal stadig køre.

**Adjusting the laser current**

Attention: When exchanging the RAFOC unit (pos. nr. 9607), the laser output potentiometer (pos. nr. 30R3106) should be placed in mechanical mid-position to avoid damage to the laser.

Connect CD voltmeter across 30R3102.

Put test disc no. 5 (disc without defects part no. 3634031) on the turntable.

Put the player in service position. (Short circuit the service plug on PCB5 and plug into mains supply at the same time).
Then press OPEN and PLAY simultaneously and twice.

Adjust 30R3106 until the voltage across 30R3102 is about 40 mV.
(This voltage varies when the disc is rotated).

Leave service position 2 by switching of the mains briefly.

Play track 1 of test disc 5.

Adjust 30R3106 until the voltage across 30R3102 is 50 mV ±5 mV.

**Check of disc motor system**

1. Interrupt the Vc connection by desoldering 30D6110 and 30D6111.

2. Connect channel A of a dual-beam oscilloscope to the emitter of transistor 96TR6082 on the motor PCB and channel B to the emitter of transistor 96TR6084. Position of the oscilloscope: 2 V/div – 10 ms/div.

3. Put the player in service position 1. (Short circuit the service plug on PCB5 and plug into mains supply at the same time).
   Then press OPEN and PLAY simultaneously.

4. Inject a *negative* voltage (V-in) to pin 1 of 30P36. This voltage *may only* be injected *after* the player is put in service position 1. (The power supply in the player must be ON).

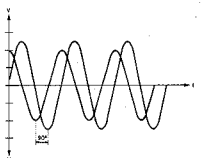
   Start from 0 V and lower this voltage fast until the motor is running (max. -5 V).

   When the motor is running, the voltage can be reduced to -1.5 V.

   The motor should keep on running.

5. Sinus signaler (V-out) skal nu være synlige på oscilloskopet. Efter ca. 2 sek. skal signalerne ligge symmetrisk omkring 0 V, og være 90° faseforskudt (se tegning).
Størrelsesforholdet mellem de 2 signaler må højst være 1:2.

5. Now sinusoidal signals (v-out) should be present on the oscilloscope (see figure) which, after about 2 seconds, lie symmetrically round the 0-axis and have shifted 90° in phase relative to one another.
The amplitudes of these 2 signals have a maximum permissible ratio of 1:2.




6. Amplituden er afhængig af størrelsen af den tilførte DC spænding.
Forholdet V-in/V-outpp skal ligge mellem 1:2 og 1:3.

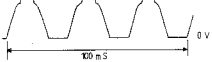
6. The amplitude is dependent on th injected voltage.
The ratio V-in/V-outpp should lie between 1:2 and 1:3.

7. DC spændingsforsyningen (V-in) ændres indtil motoren kører 600 omdr. min. (V-out frekvens = 30 Hz).
V-in skal ligge mellem -1,5 V og -3,7 V med 600 omdr. min.

7. Now adjust V-in until the motor rotates 600 r.p.m. At 600 r.p.m. the frequency of V-out is 30 Hz.
V-in should lie between -1.5 V and -3.7 V at this speed.

8. Mål med oscilloskop, først over 96R3094, og derefter over 96R3093 på disc motor control PCB'en. De 2 stråler på et dobbelt stråle oscilloskop *må ikke* tilsluttes over de 2 modstande samtidig, da forsyningsspændingerne ellers kortsluttes.
Spændingsforsyningen reguleres, indtil der ses 3 pulser med oscilloskopet på 100 mS. (se tegning).

8. Measure with an oscilloscope first across 96R3094 and hereafter across 96R3093 on the disc motor PCB. DO not measure across both resistors at the same time, as this will cause short circuit of the power supplies.
Now adjust the injected voltage in such a way that 3 complete pulses are visible during 100 mS. (See figure).




Oscilloskopet polariseres sådan, at pulserne vender som vist.

The polarity of the oscilloscope must be chosen so that the tops of the pulses are in upward position.

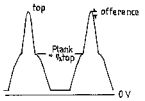
9. DC spændingsforsyningen reguleres til -1,7 V ±0,5 V på P36-1 på servo PCB'en.

   Reference spænding over 96R3094 = 56,4 mVpp.
   Reference spænding over 96R3093 = 58,8 mVpp.
   Hvis forskellen på de 2 spændinger er større end 6 mV, når spændingerne er lavere end reference værdierne, er motoren defekt.

9. Adjust the injected voltage until -1.7 ±0.5 V are present on pin 1 of P36 on the servo PCB.

   Reference voltage across 96R3094 = 56.4 mVpp.
   Reference voltage across 96R3093 = 58.8 mVpp.
   If the difference of the 2 voltages exceeds 6 mV, while the voltages are below the reference values, the motor is defect.

10



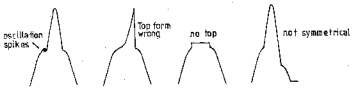

10

Toppen må højest variere 24 mV i amplitude.
Flanken må højest variere 36 mV i amplituden.

Top difference must not exceed 24 mVpp amplitude.
Flank difference must not exceed 36 mVpp amplitude.

11. Eksempler på pulsformer som er udtryk for fejl i disc motor systemet.

11. Examples of wave forms when the disc motor system is faulty.




12. DC spændingsforsyningen reguleres til -1,5 V på P36-1 på servo PCB'en.
    Motoren skal stadig køre.
    Pulsens amplitude falder, men pulsformen skal stadig være symmetrisk og afrundet.

12. Adjust the injected voltage until -1.5 V are present on pin 1 of P36 on the servo PCB.
    The motor should keep on running
    The amplitude of the pulse will be lower, but the wave form has to be symmetrical and rounded.

**Konklusion:**

Hvis ovennævnte punkter kan opfyldes, er disc motor systemet i orden.

**Conclusion:**

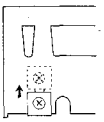
When all above mentioned conditions are fulfilled it may be assumed that the disc motor system is all right.

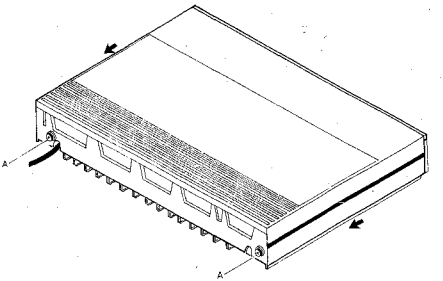
## ADSKILLELSE

### Transportsikring

Før brug fjernes de to transportskruer i bunden, og placeres som beskrevet på bunden.

### Kabinet

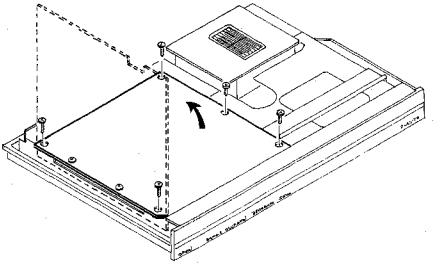





Skruerne (A) løsnes, skubbes op og spændes.

Kabinettet presses ca. 1 cm. bagud, og løftes af.

### PCB



De 5 skruer fjernes.

PCB stilles i service position som vist.

## DISASSEMBLY

### Transport protection

Before use remove the two transport screws on the base and insert them as described on the base.

### Cabinet

Loosen, push up and tighten screws (A).

Press the cabinet approx. 1 cm to the rear and lift off.

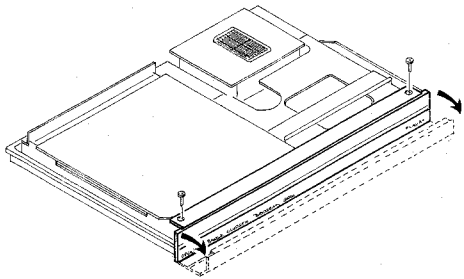
### PCB

Remove the five screws.

Place the PCB in service position as shown.

**Frontpanel**

**Front panel**



Afmonter de to viste skruer

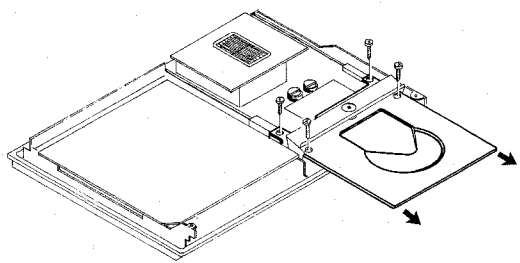
Vip frontpanelet frem.

Remove the two screws as shown.

Tip the front panel forwards.

**Disc skuffe**

**Disc tray**



Afmonter de fire viste skruer.

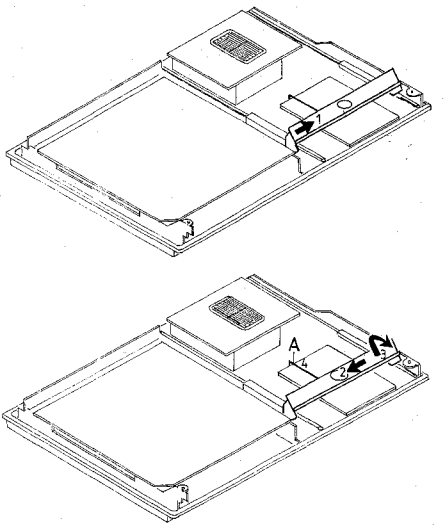
Træk forsigtigt skuffen ud.

Remove the four screws shown.

Pull out the drawer carefully.

**Disc holder**

**Disc holder**




Skuffen skal stå i »OPEN« position.

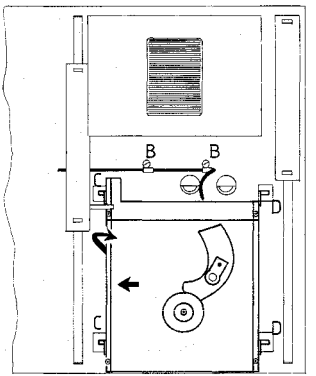
1. Disc holderen vippes af plastakslen i venstre side.
2. Disc holderen vippes af plastakslen i højre side.
3. Disc holderen drejes i pilens retning.
4. Metalarmen (A) kan derefter trækkes af.

The disc tray must be placed in 'OPEN' position.

1. Tip the disc holder off the plastic shaft in the left side.
2. Tip the disc holder off the plastic shaft in the right side.
3. Carefully turn the disc holder in the direction of the arrow.
4. Carefully pull off the metalholder (A).

Løbeværk

CD mechanism




1. De to ledningsholdere (B) drejes med uret
2. De to plastflige (C) i bundpladen til venstre for løbeværket presses ned. Samtidig presses løbeværket mod venstre.
3. Løbeværket kan derefter forsigtigt løftes op i venstre side.
4. Til sidst trækkes løbeværket forsigtigt fri af de to holdere (D) i højre side.

NB! Undgå at trække i selve løbeværket, da det er fastgjort i gummistykker.

Vær også opmærksom på flexprintet mellem løbeværk og servo.
Undgå at udsætte dette flexprint for skarpe bøjninger.

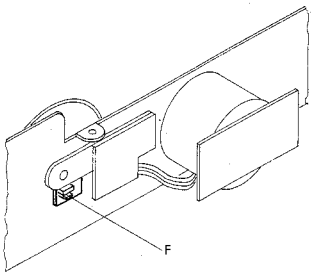
1. Turn the two leadholders (B) clockwise.
2. Push the two plastic tags (C), which are placed in the bottom plate on the left af the CD mechanism, down. Simultaneously push the mechanism to the left.
3. Now carefully lift off the mechanism in the left side.
4. After that the mechanism can be pulled off the lead holders (D) in the right side.

NOTE! Avoid pulling the mechanism itself, as it is hanging in four rubber pieces.

Be aware of the flex PCB between the mechanism and the servo.
Avoid bending this PBC sharply.

**Snorhjul pos nr. 9014**

**Cord pulley Pos. no. 9014**



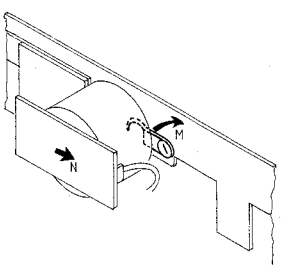

Plastfligen (F) presses op.

Træk snorhjulet af akslen.

Push the plastic tag (F) upwards.
The cord pulley can now be pushed off the shaft.

**Skuffemotor pos. nr. 06M1**

**Tray motor Pos. no. 06M1**




Plastkrogen (M) drejes op.

Skyd skuffemotoren ud af holderen i pilen's retning (N).

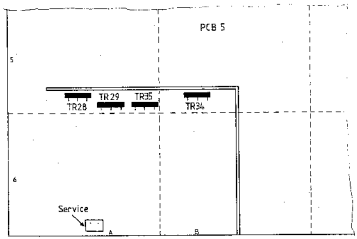
Turn the plastic hook upwards. (M)

The cord pulley can now be pushed out in the direction of the arrow (N)

Bang & Olufsen

**REPARATIONSTIPS**
**Serviceprogram**
Kortslut servicestikket på PCB5, samtidig med at netstikket sættes i.

**REPAIR HINTS**
**Service program**
Short-circuit the service plug on PCB5 and plug into mains supply at the same time.




| | | |
|---|---|---|
| Tast OPEN og PLAY samtidigt<br><br>Press OPEN and PLAY simulta-neously | Display indikerer serviceposition 1.<br><br>Display indicates service position 1. | |
| Tast PLAY<br><br>Press PLAY | Laserarm svinger ud.<br><br>Laser arm swings out. | *Hvis arm bliver stående:*<br>Er fleks-PCB rigtigt placeret?<br>Går radialspole imod?<br>Er trægheden i armlejet for stor?<br><br>*If arm doesn't move:*<br>Is flex-PCB placed correctly?<br>Does radial coil touch?<br>Is arm bearing inertia excessive? |
| Tast OPEN<br><br>Press OPEN | Laserarm svinger ind.<br><br>Laser arm swings in. | *Hvis arm bliver stående:*<br>Er fleks-PCB rigtig placeret?<br>Går radialspole imod?<br>Er trægheden i armlejet for stor?<br><br>*If arm doesn't move:*<br>Is flex-PCB placed correctly?<br>Does radial coil touch?<br>Is arm bearing inertia excessive? |
| Ilæg CD-plade<br><br>Load compact disc | | |
| Tast OPEN and PLAY samtidigt | Display indikerer 2.<br><br>Laser tænder og søger focus.<br><br><br><br>Hvis display indikerer 2 konstant:<br><br>Focussøgning i orden. | *Hvis 2 i displayet blinker:*<br><br>CD bliver ved med at søge i focus, indtil der tastes OPEN og PLAY samtidigt.<br><br>Tændes laser?<br>Regulerer FE-udgangen til focus motoramplifier?<br>Regulerer focusmotor? |

**Oversigt over IC ben**

Nedenstående skemaer er en kort beskrivelse af funktionen af de vigtigste ben på servo og decoder IC'erne.
De steder hvor 2 IC'er har direkte forbindelse med hinanden, er der kun nævnt benet på den ene IC.

**IC pin survey**

The following surveys shortly describes the function of the most important pins of the servo and decoder IC's.
Where 2 IC's are directly connected only one pin is mentioned

**5IC6 MAB 8441**

| PIN | BEMÆRKNINGER/REMARKS | PLAY POSITION | SERVICE POSITION 1 | SERVICE POSITION 2 | SERVICE POSITION 3 | SERVICE POSITION 4 | SEARCH POSITION |
|---|---|---|---|---|---|---|---|
| 21 | $\overline{SI}$ (Start Initialization). Når $\overline{SI}$ er »low«, er laserforsyningen og focus styring tændt.<br>When $\overline{SI}$ is 'low' the laser supply and the focus control are switched on. | »Low« | »High« | »Low« | »Low« | »Low« | »Low« |
| 7 | RD (Ready). Med plade på pladeholderen vil RD forblive »high« når focuspunktet er fundet.<br>With a disc on the turntable, RD stays 'high', when the focal point has been found. | »High« | »Low« | »High« | »High« | »High« | »High« |
| 20 | $\overline{SSM}$ (Motor Start-Stop signal). Når RD er gået »high«, vil $\overline{SSM}$ være »high« i et kort øjeblik (<0,2 sek.), og discmotor forstærkeren tændes (styret af MCES signalet).<br>When, after RD 'high', the $\overline{SSM}$ is high for a short moment (<0.2 sec.), the disc motor amplifier will be switched on (controlled by the MCES signal). | 136 µS | »Low« | »Low« | 136 µS | 136 µS | 136 µS |
| 8 | B0 Tænder radial kontrol. Styrer niveauet på radial servo DAC udgang. I søge position vil der være aktivitet på alle 4 udgange. | »High« | »Low« | »Low« | »Low« | »High« | »Activity« |
| 9 | B1 | »High« | »High« | »High« | »High« | »High« | »Activity« |
| 10 | B2 Switches the radial control on. Controls the level on the radial servo DAC output. In search mode, there should be activity on all 4 pins. | »High« | »High« | »High« | »High« | »High« | »Activity« |
| 11 | B3 | »Low« | »Low« | »Low« | »Low« | »Low« | »Activity« |
| 12 | $\overline{TL}$ (Track Loss). $\overline{TL}$ giver information til 5IC6 om at tab af spor kan være forestående. 5IC6 kan så give korrektionssignaler med B0-B3.<br>$\overline{TL}$ tells 5IC6 that track loss treatens. 5IC6 can give correction signals with B0-B3 | »High« | »High« | »Low« | »Activity« | »High« | »Activity« |
| 13 | RP (Radial Position). RP bestemmer laserarmens position i forhold til sporet, og korrigerer ved spring over spor og ved mekaniske stød mod apparatet.<br>RP determines the position of the arm relative to the track and to check/correct in case of track jumping or bumping against the player | | | | »Activity« | | »Activity« |
| 22 | $\overline{DODS}$ (Drop Out Detector Suppression). Når $\overline{DODS}$ er »low«, har drop out signaler ingen indflydelse på styringen af laserarmen under søg.<br>When $\overline{DODS}$ is 'low' drop out signals do not influence on the arm control during track jumping. | »High« | »Low« | »Low« | »Low« | »High« | »Activity« |
| 6 | $\overline{RPU}$ (Radial Pulse). $\overline{RPU}$ aflader 30C2156 under søg. 30IC2156 virker som hukommelse for stigningsgraden på pladen.<br>During search, $\overline{RPU}$ clears 30C2156. 30C2156 memorizes the degree of inclination of the disc. | »High« | | | | »High« | »Activity« 0.1 mS/ Div. |

7-2

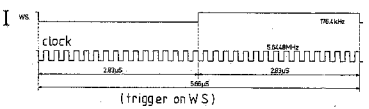
7-2

| | | |
|---|---|---|
| Press OPEN and PLAY simultaneously | Display indicates 2.<br><br>Laser switches on and searches for focus<br><br><br><br><br>If display indicates constant 2:<br><br>Focus search is OK. | *If 2 in the display flashes:*<br><br>CD continues searching for focus until OPEN and PLAY are pressed simultaneously.<br>Does laser switch on?<br><br>Does FE output controlling focus motor amplifier regulate?<br>Does focus motor regulate? |
| Tast OPEN og PLAY samtidigt | Display indikerer 3.<br><br>CD-motor starter rotation og laser placeres mod centrum. | *Hvis CD-plade ikke roterer:*<br>Starter RD-udgangen turntable motoramplifier?<br>Er MCES-pulsen tilstede? |
| Press OPEN and PLAY simultaneously | Display indicates 3.<br><br>CD motor starts rotation, and the laser is positioned towards the centre. | *If compact disc doesn't rotate:*<br>Does RD output start the turntable motor amplifier?<br>Is MCES pulse present? |
| Tast OPEN og PLAY samtidigt | Display indikerer 4.<br><br>Radialsøgning startes.<br><br>Hvis display indikerer 4 konstant.<br><br>Radial søgning i orden. | *Hvis 4 i displayet blinker:*<br><br>Regulerer RE-udgangen til radial motoramplifier?<br><br>Subcode info er ignoreret. Musik kan høres, fordi MUSB er høj men er afhængig af lead-in sporets længde. Kan vare op til 1 min. |
| Press OPEN and PLAY simultaneously | Display indicates 4.<br><br>Radial search is started.<br><br>If display indicates constant 4.<br><br>Radial search is OK. | *If 4 in the display flashes:*<br><br>Does RE output controlling radial motor amplifier regulate?<br>Subcode info has been ignored. Music is audible because MUSB is high but dependet on length of lead-in track. May last up to 1 minute. |
| Tast PLAY | Display forbliver i 4 konstant.<br><br>Laserarm springer ud over spor. | *Hvis 4 i displayet blinker:*<br><br>Kontroller radialservo. |
| Press PLAY | Display remains in 4 constantly.<br><br>Laser arm jumps out across tracke. | *If 4 in the display flashes:*<br><br>Check radial servo. |
| Tast OPEN | Display forbliver i 4 konstant.<br><br>Laserarm springer ind over spor. | *Hvis 4 i displayet blinker:*<br><br>Kontroller radialservo. |
| Press OPEN | Display remains 4 constantly.<br><br>Laser arm jumps in across tracks. | *If 4 in the display flashes:*<br><br>Check radial servo. |
| Serviceprogrammet kan gentages ved at taste OPEN og PLAY samtidigt. Displayet indikerer da kort efter serviceposition 1.<br>Serviceprogrammet afsluttes ved kortvarigt at fjerne netstikket. | | The service program can be repeated by pressing OPEN and PLAY simultaneously. The display will shortly afterwards indicate service position 1.<br>The service program is terminated by briefly disconnecting the mains supply. |

| PIN | BEMÆRKNINGER/REMARKS | PLAY POSITION | SERVICE POSITION 1 | SERVICE POSITION 2 | SERVICE POSITION 3 | SERVICE POSITION 4 | SEARCH POSITION |
|---|---|---|---|---|---|---|---|
| 28 | CRI (Counter Reset Inhibit). CRI er »low« ved spring over spor.<br>CRI is 'low' in case of track jumping. | »High« | | | | »High« | »Activity« |
| 32 | DEEM (Deemphassis). »Low« ved afspilning af testplade 5A spor 14.<br>»High« ved afspilning af testplade 5A spor 15.<br>'Low' when playing test disc 5 track no. 14<br>'High' when playing test disc 5 track no. 15 | | | | | | |
| 19 | OSC. Indgang fra krystal oscillator.<br>Input from crystal oscillator | 11.28 MHz | 11.28 MHz | | | 11.28 MHz | |
| 11 | MUTE. Muter audio signalet<br>Mutes the audio signal | »High« | | | | »High« | »High« |
| 22 | PD/OC (Phase Detector/Oscillator Control).<br>Pulser fra fasedetektorens udgang integreres og regulerer oscillatorfrekvensen.<br>Pulses from the output of the phasedetector are integrated and controls the oscillatorfrequency. | | | | | | |
| 23 | IREF. Strøm reference til fasedetektoren.<br>Current reference for the phasedetector. | | | | | | |
| 24 | FB (Feed Back). Fastholder data slicerens arbejdspunkt.<br>Keeps the operating point for the data slicer. | | | | | | |

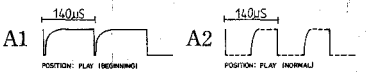
**5IC9 SAA 7220**

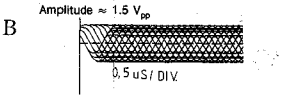
| PIN | BEMÆRKNINGER/REMARKS | PLAY POSITION | SERVICE POSITION 1 | SERVICE POSITION 2 | SERVICE POSITION 3 | SERVICE POSITION 4 | SEARCH POSITION |
|---|---|---|---|---|---|---|---|
| 18 | WS (Word Select) | I | I | I | I | I | I |
| 16 | Clock | | | | | | |
| 15 | Data | »Activity« | »Stable« | »Stable« | »Stable« | »Activity« | »Activity« |
| 22 | ATSB (Attenuation Audio Signal). Ved »low« dæmpes signalet 12 dB.<br>When 'low', the signal is lowered with 12 dB | | | | | | |
| 23 | MUSB (Soft Mute). MUSB er »low« ved spring fra et spor til et andet.<br>*Vil være »high« ved søgning i serviceposition 4.<br>MUSB is 'low' when jumping from one track to another.<br>*Will be 'high' when using search in service position 4. | »High« | | | | »High« | *»Low« |
| 14 | DOBM (Digital Output). Fejlkorrigeret audio og subcode data.<br>Error corrected audio and subcode data. | | | | | | |

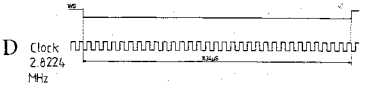


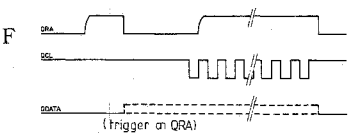
5IC7 SAA7210

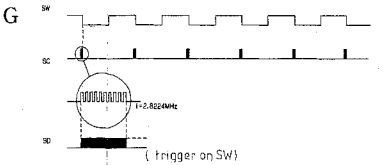
| PIN | BEMÆRKNINGER/REMARKS | PLAY POSITION | SERVICE POSITION 1 | SERVICE POSITION 2 | SERVICE POSITION 3 | SERVICE POSITION 4 | SEARCH POSITION |
|---|---|---|---|---|---|---|---|
| 17 | MCES (Motor Control). MCES styrer discmotorens hastighed.<br>MCES controlls the turntable motor speed. | $A_1/A_2$ | $A_2$ | $A_2$ | $A_1/A_2$ | $A_1/A_2$ | $A_1/A_2$ |
| 25 | HF (High Frequency). Indgang for HF øje mønster.<br>*Efter lead-in er læst<br>HF eye pattern input.<br>*After lead-in has been read. | B (Stable) | | | B (Unstable) | B* (Stable) | »Activity« |
| 26 | HFD (High Frequency Detector). HFD vil gå »low« når HF signalet er for svagt.<br>*Ved afspilning af testplade 5A, vil HFD give »low« pulser på spor med afbrydelser og sorte pletter.<br>HFD will go 'low' when the HF signal is too low.<br>*When playing test disc 5A, track numbers with interruption or black dot, HFD will make low pulses. | »High«* | | | | »High« | »Activity« |
| 27 | CEFM. Spændings kontrolleret oscillator udgang.<br>*Hvis pladen bremses forsigtigt med hånden, vil oscillator frekvensen falde.<br>CEFM. Voltage controlled oscillator output.<br>*When the disc is slowly bracked by hand, the oscillator will lower its frequency. | 4.32 MHz* | 2.82 MHz | 2.82 MHz | 4.32 MHz* | 4.32 MHz* | 4.32 MHz |
| 39 | WS (Word Select) | D | | | D | D | D |
| 38 | Clock | D | | | D | D | D |
| 37 | Data | »Activity« | | | | »Activity« | »Activity« |
| 36 | E Flag (Error Flag). Indikerer utroværdige samples for 8 sample interpolator.<br>Indicates untrustworty samples for 8 sample interpolator. | | | | | | »Activity« |
| 30<br>31<br>29 | QRA (Q-channel Request Acknowledge).<br>QCL (Q Clock).<br>QData<br>QRA initieres af 5IC6 med »high«, 5IC7 svarer med »low«. Ved forkanten på næste clock puls sættes QRA »high« igen af 5IC6.<br>Når 5IC6 har modtaget nok information (via Q Data), går QRA »low«. Dette gør at QRA tiden varierer.<br>QRA is initiated by 5IC6 with 'high', 5IC7 answers with 'low'. With the next leading clock (Q CL) the QRA is set 'high' again by 5IC6.<br>When 5IC6 has taken enough information (via Q Data), QRA will go 'low'. This makes the QRA times vary each time. | F<br>F<br>F | | | | F<br>F<br>F | |
| 33<br>35<br>34 | SW (Subcode Word clock).<br>SC (Subcode Clock).<br>SD (Subcode DATA)<br>Efter Motor Start Pulse vil Subcode Word Clock være synlig.<br>Medens en burst på 10 clock pulser er synlig på SC, overføres Q-channel information på SD.<br>Herefter følger P-bit indikation.<br>P-bit indikationen kommer mellem 2 bursts på 10 clock pulser. Ved pause er P-bit indikationen »high« og ved musik er den »low«.<br>After Motor Start Pulse, Subcode Word Clock is visible.<br>While the burst of 10 clock pulses appear on SC, the Q-channel information is transferred on SD.<br>Hereafter the P-bit indication follows.<br>The P-bit is 'high' between two bursts of 10 clock pulses in case of pause indication, and 'low' in case of music indication. | G | | | G | G | |



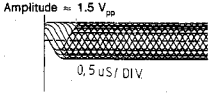
30IC6102 TDA 5709

| PIN | BEMÆRKNINGER/REMARKS | PLAY POSITION | SERVICE POSITION 1 | SERVICE POSITION 2 | SERVICE POSITION 3 | SERVICE POSITION 4 | SEARCH POSITION |
|---|---|---|---|---|---|---|---|
| 10 | DAC (Digital to Analogue Converter). DAC styrer hastigheden på spring over spor.<br>Signalet er genereret af B0-B3.<br>*Når man banker forsigtigt på apparatet vil der være aktivitet.<br><br>DAC controls the track jumping speed.<br>The signal is derived from the signals B0-B3.<br>*Knock carefully on the set, and there should be activity. | * | | | »Low« | * | »Activity« |
| 7 | RE (Radial Error). RE holder lyspletten på sporet.<br>*En 650 Hz sinus vil være synlig i RE signalet.<br><br>RE keeps the light spot on track.<br>*A 650 Hz sine wave should be visible in the RE signal. | * | | | | * | |
| 8 | RE lag (Radial error for lag network). 30C2156 i RE lag kredsløbet har en hukommelsesfunktion. Den husker stigningsgraden på pladen. Når der springes til et givet spor på pladen, skal denne hukommelse tømmes. Det gøres med 5IC6 via 30TR6109.<br>*En 650 Hz sinus vil være synlig i RE lag signalet.<br><br>30C2156 in the RE lag circuit has a memory function. It memorizes the degree of inclination on the disc. When a jump is made to a certain track on the disc, the memory should be cleared. This is done by 5IC6 via 30TR6109.<br>*A 650 Hz sine wave should be visible in the RE lag signal. | * | | | | * | |
| 4 | D factor. (Offset control). Typical 0V | Min.Gain -2.5V | +4 | | -0.5V | -1V/-1.5V | |
| 5 | K factor. (Gain control). Typical -1V/-1.5V | Max.Gain -0.5V | | | | | |

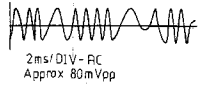
30IC6101 TDA 5708

| PIN | BEMÆRKNINGER/REMARKS | PLAY POSITION | SERVICE POSITION 1 | SERVICE POSITION 2 | SERVICE POSITION 3 | SERVICE POSITION 4 | SEARCH POSITION |
|---|---|---|---|---|---|---|---|
| 17 | LO (Laser Out). | »High« | »Low« | »High« | »High« | »High« | »High« |
| 16 | LM (Laser Monitor) Via LM styres strømforsyningen til laser dioden.<br>Via the LM the power supply for the laser diode is controlled. | 200 mV ±50 mV | | 200 mV ±50 mV | | | |
| 5 | FE (Focus Error). FE styrer focus enheden.<br>Når SI går »high« søges der efter focus punktet.<br>Når apparatet sættes i serviceposition 2 uden plade, vil optikket søge efter focus punktet.<br>På ben 5 vil FE signalet variere mellem 0 V og +4 V.<br>FE drives the focusing unit.<br>When the SI goes 'high', the focal point will be searched for.<br>When the player is brought into servicing position 2 without disc, the objective will search for the focal point.<br>At pin 5 the FE signal varies between 0 V and +4 V. | | | | | | |
| 9<br>10<br>8<br>7 | D1 D1–D4 er korrektionssignaler for fotodiode kredsløbet.<br>Hvis pladen bevæges når apparatet er i serviceposition 2, skal focusenheden holde focus.<br>D2 Når pladen bevæges, skal der være varierende signaler på ben 7, 8, 9 og 10.<br>D3 D1–D4 are the error signals from the photodetector circuits.<br>When in servicing position 2 the disc is moved, the focusing unit should keep the laser<br>D4 beam in focus.<br>When the disc is moving, there should be a changing signal on pin 7, 8, 9, 10. | | | | | | |
| 3 | HF (High Frequency). HF information fra de 4 fotodioder.<br>HF information from the 4 photodiodes. | | | | | | |
| 27 | HF out (High Frequency out). HF out er et forstærket informationssignal til decoderen.<br>*Efter lead-in er læst.<br>HF out is the amplified information signal for the decoder.<br>*After lead-in has been read. | B (Stable) | | | B (Unstable) | B* (Stable) | |
| 26<br>19<br>18 | DET (Detector).<br>HFD (High Frequency DETECTOR).<br>TL (Track Loss).<br>DET giver information om HF signalets niveau til niveau/drop-out detektoren i 30IC6101.<br>Når HF signalets niveau er for lavt, vil HFD gå »low«. TL vil så gå »low« som information til 5IC6 om at sporings signalerne er upålidelige.<br>DET gives information on the level of the HF signal to the level/drop-out detector in 30IC6101.<br>When the level of the HF signal is too low, HFD will go 'low'.<br>TL will then go 'low' in order to tell 5IC6 that the tracking signals are unreliable. | | | | | | |
| 11<br>12 | RE1 (Radial Error). RE1-2 er styresignaler til sporing af laseren.<br>RE2<br>RE1-2 are the control signals for the arm during tracking. | | | | | J | |
| 25 | SC (Start Capacitor). *Stiger til +5 V hvis focus punktet er fundet.<br>*Rises to +5 V if focus point is found. | | -5 V | * | +5 V | +5 V | |
| 6 | FE lag (Focus Error). *Når pladen bevæges, vil signalet variere.<br>*When the disc is moved by hand, the signal will vary. | | | * | Approx. 100 mVpp | | |
| 13 | AGC. *Ved maksimum HF signal ≤-400 mV. Ved ingen HF signal +5 V.<br>*At maximum HF signal ≤-400 mV. At no HF signal +5 V. | * | »High« | »High« | * | * | |

B

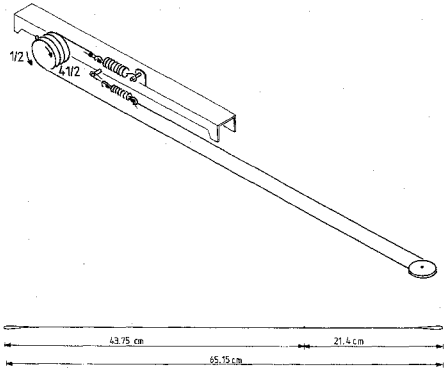



J



Snortræk

Cord drive



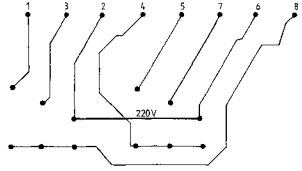

7-9



NETSPÆNDINGSVARIANTER AF TRANSFORMATOR 8005169

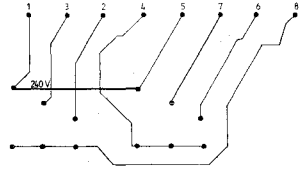
MAINS VOLTAGES FOR TRANSFORMER 8005169

220 V:



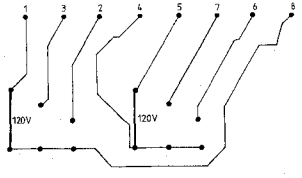

Seen From Copperfoil Side

240 V:



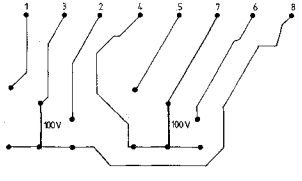

Seen From Copperfoil Side

120 V:




Seen From Copperfoil Side

100 V:




Seen From Copperfoil Side

**5IC4 MAB 8461**

| PIN | BEMÆRKNINGER/REMARKS | PLAY POSITION | SERVICE POSITION 1 | SERVICE POSITION 2 | SERVICE POSITION 3 | SERVICE POSITION 4 | SEARCH POSITION |
|---|---|---|---|---|---|---|---|
| 1 | DATA LINK Data bus for betjening i forbindelse med Beomaster/Beocenter.<br>Data bus for control in connection to Beomaster/Beocenter. | | | | | | |
| 2<br>3 | $I^2C$ DATA $I^2C$ DATA og CLOCK for system kontrol.<br>$I^2C$ CLOCK $I^2C$ DATA and CLOCK for system control. | »Activity« | »Activity« | »Activity« | »Activity« | »Activity« | |
| 12<br><br><br>4<br>5<br>6<br>7<br>8 | TRAY POSITION Information til 5IC4 om pladeskuffens øjeblikkelige position ved ind og ud transport, hvorefter ben 4, 5, 6, 7 og 8 kan bestemme hastigheden.<br><br>TRAY<br>SPEED<br>Information to 5IC4 about the instant position of the CD tray when moving in or out,<br>where upon pin 4, 5, 6, 7 and 8 determines the speed. | | | | | | |
| 9<br>10 | TRAY IN Bestemmer om pladeskuffen skal gå ind eller ud.<br>TRAY OUT Determines whether the CD tray moves in or out. | | | | | | |
| 20<br>21 | TRAY IN Information til 5IC4 om pladeskuffen er inde eller ude.<br>TRAY OUT Information to 5IC4 whether the CD tray is in or out. | | | | | | |
| 22 | POWER ON/OFF Tænder og slukker strømforsyningerne til servo og signalbehandlings-kredsløbene.<br><br>Switches the power supplies to the servo and signal processing circuits on and off. | | | | | | |
| 24 | ENABLE Enable signal til displayet.<br><br>Enables the display. | | | | | | |
| 25 | MUTE Muter audio signalet.<br><br>Mutes the audio signal. | »Low« | »Low« | »Low« | »Low« | »Low« | |

ISOLATIONSTEST

Når et apparat har været skilt ad, *skal* det isolationstestes. Testen skal udføres, efter at apparatet er blevet samlet igen og er klar til levering til kunden.

**Isolationstest for Beogram CD5500**

Isolationstesten udføres som følger:
Kortslut de to stikben i netstikket og tilslut en af isolationstestapparatets terminaler. Isolationstestapparatets anden terminal tilsluttes stelbenet i en af phonobøsningerne.

NB!
For at undgå at ødelægge apparatet er det meget vigtigt, at begge isolationstestapparatets terminaler er i virkelig god mekanisk kontakt.

Så drejes isolationstestapparatets spændingsregulator langsomt, indtil man opnår en spænding på 1,5kV. Hold den der i 1 sekund, og skru så langsomt ned for spændingen igen.

Derefter flyttes terminalen fra stelbenet til en skrue i bunden af apparatet.

Så drejes isolationstestapparatets spændingsregulator igen langsomt, indtil man opnår en spænding på 1,5kV. Hold den der i 1 sekund, og skru så langsomt ned for spændingen igen.

**Der må på intet tidspunkt i testforløbet forekomme overslag.**

INSULATION TEST

Each set *must* be insulation tested after dismantling. The test is to be performed when the set has been reassembled and is ready for delivery to the customer.

**Insulation test for Beogram CD5500**

Make the insulation test as follows:
Short-circuit the two plug pins of the mains plug and connect one of the terminals of the insulation tester. Connect the other terminal of the insulation tester to the chassis pin of one of the phono bushings.

NB!
To avoid ruining the set, it is essential that both insulator test terminals are in really good mechanical contact.

Now slowly turn the voltage control of the insulation tester until a voltage of 1.5 kV is obtained. Hold it there for 1 second, and slowly turn down the voltage again.

Now move the terminal from the chassis pin to a screw in the bottom of the set.

Then again slowly turn the voltage control of the insulation tester until a voltage of 1.5 kV is obtained. Hold it there for 1 second, and slowly turn down the voltage again.

**At no point during the testing procedure any flashovers are permissible.**

## KREDSLØBSBESKRIVELSE

### Indledning

Beogram CD 5500 er en nyudviklet Compact Disc afspiller, der primært er tænkt som en del af Beosystem 5500. Beogram CD 5500 kan naturligvis også tilsluttes og betjenes via Datalink fra andre Bang & Olufsen produkter eller kan tilsluttes forstærkere af andre fabrikater via phonostik.

Beogram CD 5500 er opbygget omkring IC-sættene beskrevet i kredsløbsbeskrivelsen:

Bang & Olufsen Compact Disc
med dekoder IC-sæt SAA 7210
SAA 7220
TDA 1541P
og servo IC-sæt TDA 5708
TDA 5709

Ovennævnte kredsløbsbeskrivelse omhandler dekoder- og servo-kredsløbet. Denne beskrivelse omhandler de øvrige kredsløb i Beogram CD 5500, såsom styring og kontrol, motorkredsløb for CD-skuffe, det analoge filter og digitalt udtag.

### Styring/kontrol

Styring af Beogram CD 5500's funktioner foretages af 5IC4 (MAB 8461) og 5IC6 (MAB 8441). 5IC4 varetager den overordnede styring af CD-enheden, hvorimod 5IC6 kontrollerer laserenhedens aftastning af CD-pladen. 5IC6 omtales herefter som servoprocessor.

5IC4 (MAB 8461) er en single-chip 8-bit uC med 6 K ROM/128 RAM bytes og 8-bit LED drive.

5IC6 (MAB 8441) er en single-chip 8-bit uC med 4 K ROM/128 RAM bytes og 8-bit LED drive.

Kommunikationen mellem de to uC'er og display drive IC'en 1IC1 foregår via $I^2C$ bus. Servoprocessoren 5IC6 genererer $I^2C$ clock pulserne og optræder dermed som master på bussen.

Beogram CD 5500 aktiveres via LINK-forbindelsen fra Beomaster/Beocenter eller via tryk på frontpanelet: PLAY eller EJECT.

Netdelen startes op/afbrydes via 5IC4 ben 22 POWER ON/OFF.

Se benoversigt over 5IC4.

### Motorkredsløb for CDskuffe

### Den principielle virkemåde

Et nyt motorstyringsprincip for CD-skuffen i Beogram CD 5500 har gjort det muligt at mindske CD-skuffens transporttid væsentligt i forhold til andre kendte CD-pladespillere.

## CIRCUIT DESCRIPTION

### Introduction

The Beogram CD 5500 is a newly developed Compact Disc player which is primarily intended as a constituent of the Beosystem 5500. Of course, the Beogram CD 5500 may also be connected to and operated via Datalink from other Bang & Olufsen products, or it may be connected to amplifiers of other brands via a phono plug.

The Beogram CD 5500 has been designed around the IC sets described in the circuit description:

Bang & Olufsen Compact Disc
with the decoder IC set SAA 7210
SAA 7220
TDA 1541P
and the servo IC set TDA 5708
TDA 5709

The above-mentioned deals with the decoder and servo circuits. This description deals with the other circuits in the Beogram CD 5500, e.g., control and monitoring, motor circuit for CD tray, the analog filter and digital output.

### Control/monitoring

The functions of the Beogram CD 5500 are controlled by 5IC4 (MAB 8461) and 5IC6 (MAB 8441). 5IC4 handles the general control of the CD unit whereas 5IC6 monitors laser unit scanning of the CD. 5IC6 will be termed servo processor below.

5IC4 (MAB 8461) is a single-chip 8-bit uC with 6 K ROM/128 RAM bytes and 8-bit LED drive.

5IC6 (MAB 8441) is a single-chip 8-bit uC with 4 K ROM/128 RAM bytes and 8-bit LED drive.

Communication between the two µC's and the display drive IC 1IC1 is effected via the $I^2C$ bus. The servo processor 5IC6 generates the $I^2C$ clock pulses and thus behaves as master on the bus.

The Beogram CD 5500 is actuated via the LINK connection from a Beomaster/Beocenter or by pressing PLAY or EJECT on the front panel.

The power-supply unit is switched on/off via 5IC4 pin 22, POWER ON/OFF.

See also pin survey 5IC4 and 5IC5 in section 7, Service Tips.

### Motor circuit for CD tray

### Principle of operation

A new motor control principle for the CD tray in the Beogram CD 5500 has permitted a significant reduction in CD tray transport time compared to other recognized CD players.

Adgangstiden (tiden fra PLAY er aktiveret til CD-pladen afspilles) er yderligere nedsat, da indføringen af CD-skuffen og fastholdelse af CD-pladen foregår i samme arbejdsproces. Adgangstiden er ca. 5 sek.

Access time (the time-lapse from actuation of PLAY till the CD starts playing) has been reduced further because the driving in of the CD tray and clamping of the disc are carried out in one operation. Access time is approx. 5 sec.

Den kortere transporttid er opnået ved at øge CD-skuffens hastighed. For at CD-skuffen ikke skal køre hårdt imod endestop, reduceres hastigheden langsomt under hele transporten.

The short transport time has been achieved by increasing the speed of the CD tray. The speed is reduced gradually throughout the course of transport in order to avoid the CD tray bumping into the end stop with excessive force.

Fastholdelse af CD-pladen sker mekanisk.

The disc is clamped mechanically.

I forbindelse med CD-skuffen er der monteret en lille metalstang, der ved ind-transport af CD-skuffen griber fast i en plastvinkel på CD-løbeværket. Derved »løftes« løbeværket op, og CD-pladen fastholdes.

A small metal rod is mounted in connection with the CD tray. When the CD tray is driven in, the rod grips a plastic plate on the CD transport mechanism. The transport mechanism is thereby 'lifted', and the disc is clamped.

Ved at motorstyringskredsløbet kontinuerligt får tilbagemelding om CD-skuffens aktuelle hastighed og position, sikres det, at en øget/ændret friktion ingen indflydelse har på CD-skuffens transporthastighed.

Continuous feedback to the motor control circuit regarding current speed and position of the CD tray ensures that an increase/change of friction will have no effect on the transport speed of the CD tray.

Når CD-skuffen er helt åben eller helt lukket (ved endestop) aktiverer skuffen en kontakt (90S1).

When the CD tray is completely open or closed (at end stop), the tray actuates a switch (90S1).

Når CD-skuffen er lukket, skal kontakten være aktiveret før Beogram CD 5500 begynder aftastning af pladen. Derudover anvendes aktivering af kontakten som reference for motorstyringskredsløbet.

When the CD tray is closed, the switch has to be actuated before the Beogram CD 5500 starts scanning the disc. Furthermore, actuation of the switch is used as a reference by the motor control circuit.

Opstår der fejl, så kontakten ikke aktiveres, bliver CD-skuffen ført relativt langsomt ind f.eks. hvis CD-skuffen er blokeret i ud-transport. Aktiveres kontakten heller ikke, når skuffen er lukket, forsøger motorkredsløbet at 'trække' i CD-skuffen igen, hvorefter 'time out' funktionen træder i kraft.

If an error occurs which results in the switch not being actuated, the CD tray will be driven in at a relatively low speed, if, for example, the CD tray is blocked while being transported out. Also, if the switch is not actuated when the tray has been closed, the motor circuit tries to 'pull' the CD tray again, and then the 'time-out' function steps in.

Hvis CD-skuffen er blokeret under ind-transport, kører skuffen lidt ud og derefter forsøge at køre ind igen. Dette gentages, hvorefter CD-skuffen forbliver ude, indtil 'time out' funktionen træder i kraft.

If the CD tray is blocked while being driven in, the tray will move out a little and then try to move in again. This is repeated, and then the CD tray remains out until the 'time-out' function steps in.

**»Time out« funktionen**

I motorstyringskredsløbet for CD-skuffen er der indbygget en 'time out' funktion.

Det betyder:

- Når der ikke er fejl på apparatet lukker CD-skuffen automatisk efter 3 min, hvis PLAY ikke er aktiveret forinden.
- Ved fejl forsøger CD-skuffe motorkredsløbet at lukke/'trække' skuffen ind efter 3 min. Derefter forbliver CD-skuffen ude, og Beogram CD 5500 går i STAND BY.

**'Time-out' function**

A 'time-out' function is incorporated in the motor control circuit for the CD tray.

This means that:

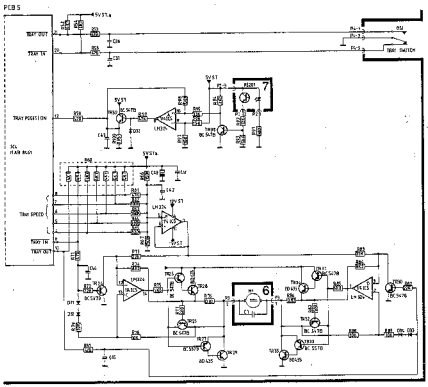
- When there is no error in the product the CD tray will close automatically after 3 minutes unless PLAY is actuated beforehand.
- In case of error, the CD tray motor control circuit will try to close/'pull' in the tray after 3 minutes. Then the CD tray remains out, and the Beogram CD 5500 goes into STAND-BY.

**Den elektriske virkemåde**

Motorkredsløbet for CD-skuffen består af en D/A-konverter, et forstærkerkredsløb og en optokobler.

**Electric operation**

The motor circuit for the CD tray comprises a D/A converter, an amplifier circuit and an optocoupler.



Ved hjælp af D/A-konverteren (dannet af 5R6165 og 5IC5b) styrer 5IC4 CD-skuffemotorens hastighed. Niveauet på ben 9 og 10 af 5IC4 angiver CD-skuffens retning.

5IC4 controls the CD tray motor's speed by means of the D/A converter (formed by 5R6165 and 5IC5b). The level at pins 9 and 10 of 5IC4 determines the transport direction of the CD tray.

Motorstyringskredsløbet får tilbagemeldingen fra optokobleren 7PE201.

The motor control circuit receives feedback from the optocoupler 7PE201.

Optokobleren 7PE201's opgave er at informere 5IC4 om CD-skuffens aktuelle hastighed og position under transport.

The optocoupler, 7PE201, has to provide 5IC4 with information on the current speed and position of the CD tray during transport.

Lyset i optokobleren brydes af en tacho-skive. Tacho-skiven er er støbt sammen med en remskive og et snorhjul.

The light in the optocoupler is broken by a tacho disc. The tacho disc is cast together with a belt pulley and a cord pulley.

Remskiven drejes af CD-skuffemotoren. Omkring snorhjulet er der viklet en nylonsnor, hvis ender er fæstnet til CD-skuffen.

The belt pulley is driven by the CD tray motor. A nylon cord with the ends tied to the CD tray is wrapped around the cord pulley.

Tacho-skiven drejer derfor i takt med CD-skuffens bevægelse.

Consequently, the tacho disc rotates in line with the movement of the CD tray.

Ved at 'tælle' impulserne er 5IC4 istand til at beregne CD-skuffens aktuelle hastighed og position. Derved kan 5IC4 tilpasse skuffemotorens hastighed i forhold til CD-skuffens position. Fra endestop til endestop modtager 5IC4 ca. 80 pulser fra optokobleren.

By 'counting' the pulses, 5IC4 is able to calculate the current speed and position of the CD tray. 5IC4 can thus adapt tray motor speed relative to the position of the CD tray. 5IC4 receives approx. 80 pulses from the optocoupler from end stop to end stop.

90S1 aktiveres af CD-skuffen, når skuffen er helt åben eller helt lukket (endestop). Kontakten sluttes normalt ca. 3 sek., efter at PLAY eller EJECT er aktiveret.

90S1 is actuated by the CD tray when the latter is completely open or closed (end stop). The contact is made approx. 3 seconds after PLAY or EJECT has been actuated.

5IC4 kalkulerer med et vist antal impulser fra optokobleren indenfor en bestemt tid. Hvis det forhold ændrer sig væsentligt opfatter 5IC4, at der er fejl i CD-skuffetransporten, og CD-skuffen bliver kørt langsomt ind som omtalt under 'den principielle virkemåde'.

5IC4 expects a certain number of pulses from the optocoupler within a certain period. If that number changes significantly, 5IC4 interprets this as an error in the CD tray transport, and the CD tray is driven in slowly as mentioned under "principles of operation".

**Det analoge filter**

Det analoge filter er et nyudviklet 3.-ordens Bessel-filter med nulpunkt ved 156.4 kHz. Nulpunktet dannes af et eliptisk filter. Det analoge filter er opbygget uden brug af spoler, hvilket giver en meget lav forvrængning.

**The analog filter**

The analog filter is a newly-developed 3rd-order Bessel filter with the neutral point at 156.4 kHz. The neutral point is formed by an elliptic filter. The analog filter has been designed without using coils, which results in very low distortion.

Fig. 2a

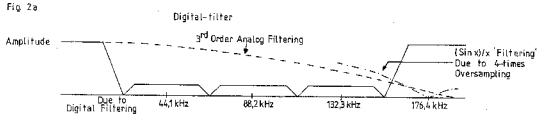
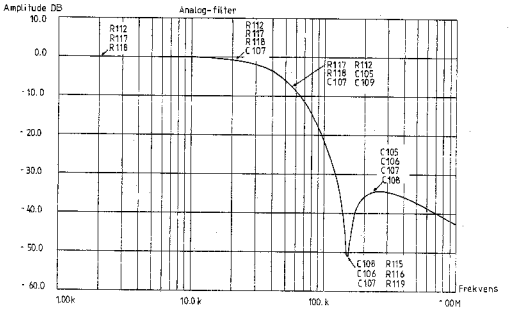



Fig. 2b




Figur 2a viser det digitale filters og et 3.-ordens Bessel-filters indvirkning på frekvenskarakteristikken.

Fig. 2a shows the frequency characteristic from the digital filter and a 3rd-order Bessel filter's influence on the characteristic.

Figur 2b viser frekvenskarakteristikken for det analoge filter med nulpunkt med indikering af de enkelte komponenters arbejdsområde.

Figure 2b shows the frequency characteristic for the analog filter with neutral point, indicating the operating range of the individual components.

Den analoge signaldel og den digitale signaldel forsynes fra hver deres netdel. Derved elimineres risikoen for at overføre støj til den analoge signaldel via forsyningsspændingen.

The analog signal section and the digital signal section are supplied from independent power-supply units. This eliminates the risk of transferring noise to the analog signal section via the supply voltage.

**Digitalt udtag**

Fra Beogram CD 5500 kan signalet udtages via phono-bøsningen D-OUT i digital form. Signalet tages fra 5IC9 (SAA 7220) ben 14. 5IC9 og D-OUT bøsningen er galvanisk adskilt. Det digitale signal indeholder foruden det fejlkorrigerede og filtrede audiosignal også subkode-informationer.

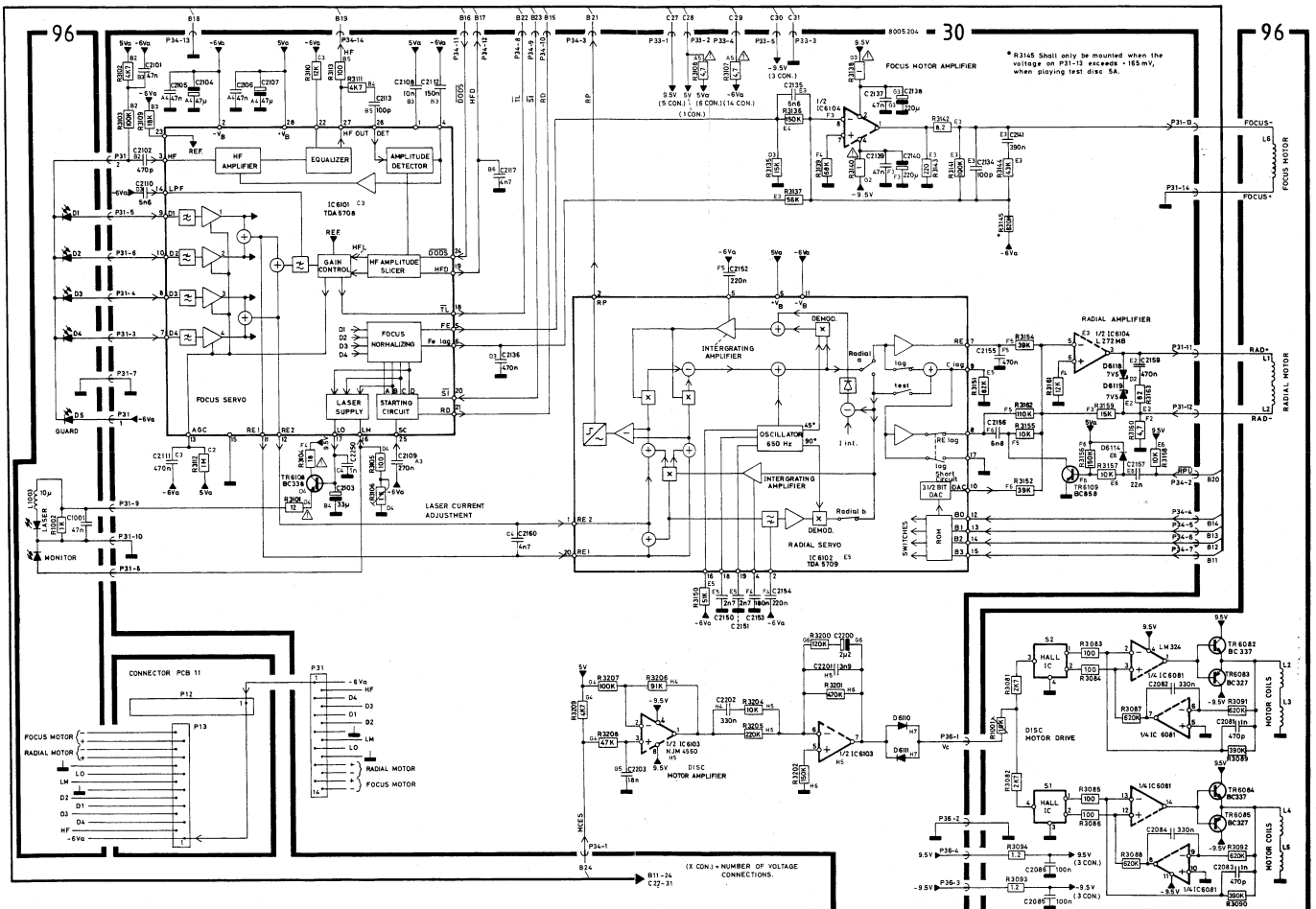
Signalet er beregnet for fremtidigt digitalt udstyr, der kan anvende eventuelle supplerende data på CD-plader. F.eks. til at vise tekst og grafik på en skærm eller til optagelse af CD-plader på en digital båndoptager.

**Digital output**

From the Beogram CD 5500 the signal can be delivered via the phono bush D-OUT in digital form. The signal is obtained from 5IC9 (SAA 7220) pin 14. 5IC9 and the D-OUT bush are galvanically separaited. The digital signal contains subcode information in addition to the error corrected and filtered audio signal.

This signal is intended for future digital equipment capable of utilizing any possible supplementary data on CD's. For example, for displaying text and graphics on a screen or for recording CD's on a digital tape recorder

**DIAGRAM A (Servo and Disc Motor System)**

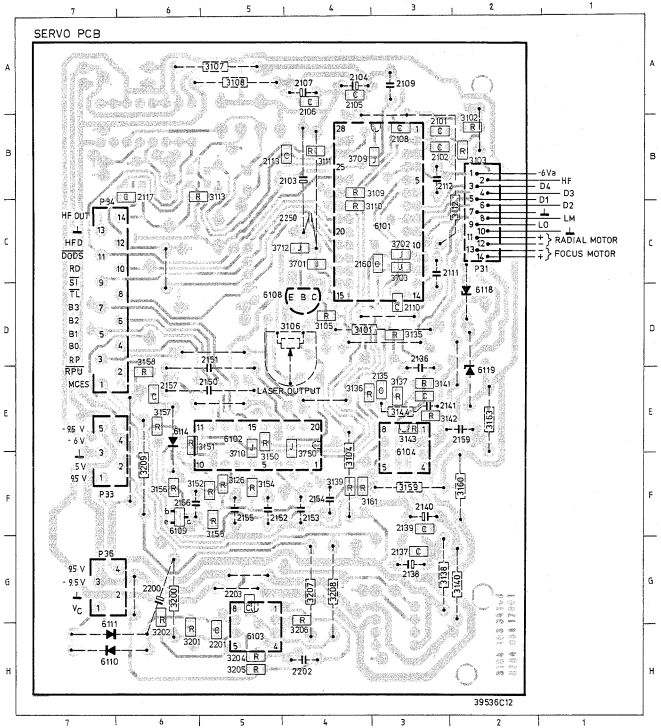


**Diagram, PCB drawing and partlist for servo PCB30 without focus off-set adjustment**

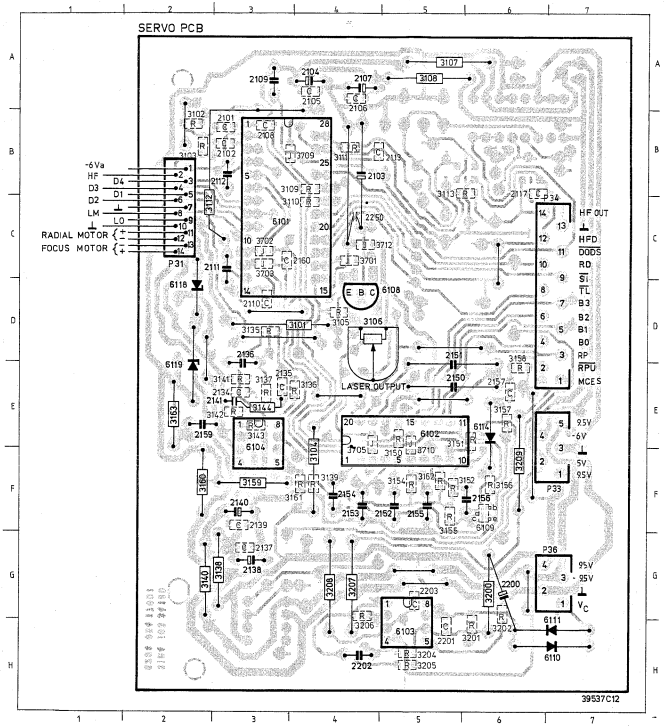
10-2

10-2

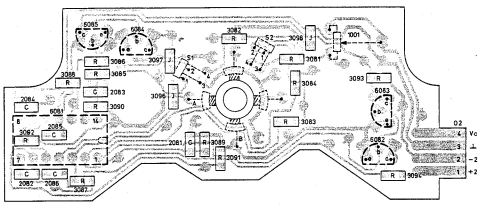
SERVO PCB 30



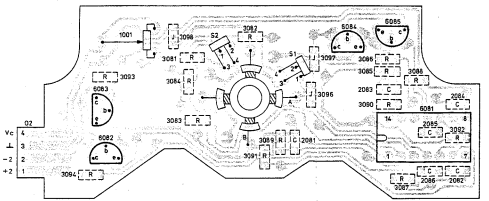

SERVO PCB 30




DISC MOTOR CONTROL



DISC MOTOR CONTROL



LIST OF ELECTRICAL PARTS

PCB 30, 8005204
Servo

| 20 | 51 | 103 | 125 | 134 | 209 | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

IC6101△ 8340991 **125** TDA 5708 C3
IC6102△ 8340992 **134** TDA 5709
IC6103 8340993 **103** NJM 4560D
IC6104 8340605 **103** L 272MH

TR6108 8320721 **020** BC 338-16
TR6109 8320616 **051** BC 858 B

D6110-D6111 8300058 **209** 1N 4148
D6114 8300058 **209** 1N 4148
D6118-D6119 8300570 **209** HZ 7C2 7V5

| | | | |
|---|---|---|---|
| R3101 | 5020966 12 Ω 5% | R3150 | 5011493 51 kΩ 2% 1/8W |
| R3102 | 5011234 4.7 kΩ 2% 1/8W | R3151 | 5011254 83 kΩ 2% 1/8W |
| R3103 | 5011256 100 kΩ 2% 1/8W | R3154 | 5011491 39 kΩ 2% 1/8W |
| R3104 | 5020967 18 Ω 5% | R3155 | 5011241 10 kΩ 2% 1/8W |
| R3105 | 5011218 100 Ω 2% 1/8W | R3156 | 5011494 150 kΩ 5% |
| R3106 | 5370355 1 kΩ 20% | R3157- | 5011241 10 kΩ 2% 1/8W |
| R3107-R3108 | 5020965 4.7 Ω 2% 1/3W | R3158 | |
| R3109 | 5011244 18 kΩ 2% 1/8W | R3159 | 5020074 15 kΩ 1% 1/4W |
| R3110 | 5011490 12 kΩ 2% 1/8W | R3160 | 5020971 4.7 Ω 1% 1/4W |
| R3111 | 5011234 4.7 kΩ 2% 1/8W | R3161 | 5011490 12 kΩ 2% 1/8W |
| R3112 | 5020288 1 MΩ 1% 1/4W | R3162 | 5011504 110 kΩ 2% |
| R3113 | 5011218 100 Ω 2% 1/8W | R3163 | 5010056 82 Ω 5% 1/4W |
| R3135 | 5011243 15 kΩ 2% 1/8W | R3200 | 5020062 120 kΩ 5% 1/4W |
| R3136 | 5011259 150 kΩ 2% 1/8W | R3201 | 5011265 470 kΩ 2% 1/8W |
| R3137 | 5011251 56 kΩ 2% 1/8W | R3202 | 5011494 150 kΩ 5% |
| R3138 | 5020964 1.0 Ω 2% 1/3W | R3204 | 5011241 10 kΩ 2% 1/8W |
| R3139 | 5011252 68 kΩ 2% 1/8W | R3205 | 5011261 220 kΩ 2% 1/8W |
| R3140 | 5020964 1.0 Ω 2% 1/3W | R3206 | 5011255 91 kΩ 2% 1/8W |
| R3141 | 5011256 100 kΩ 2% 1/8W | R3207 | 5020263 100 kΩ 1% 1/4W |
| R3144 | 5020968 43 kΩ 1% 1/4W | R3208 | 5020969 47 kΩ 1% 1/4W |
| R3145 | 5011528 820 kΩ 5% 1/8W | R3209 | 5020049 4.7 kΩ 1% 1/2W |

| | | | |
|---|---|---|---|
| C2101 | 4010192 47 nF 10% 50V | C2139 | 4010192 47 nF 10% 50V |
| C2102 | 4000249 470 pF 5% 50V | C2140 | 4200745 220 µF 16V |
| C2103 | 4200414 33 µF -10+50% 16V | C2141 | 4130407 390 nF 10% 63V |
| C2104 | 4200482 47 µF 20% 10V | C2150- | 4130416 2.7 nF 1% 250V |
| C2105-C2106 | 4010192 47 nF 10% 50V | C2151 | |
| C2107 | 4200482 47 µF 20% 10V | C2152 | 4130206 220 nF 10% 100V |
| C2108 | 4000254 10 nF 10% 50V | C2153 | 4130314 180 nF 10% 50V |
| C2109 | 4130379 270 nF 5% 63V | C2154 | 4130206 220 nF 10% 100V |
| C2110 | 4000253 5.6 nF 10% 50V | C2155 | 4130293 470 nF 10% 50V |
| C2111 | 4130405 470 nF 5% 50V | C2156 | 4130338 6.8 nF 5% 100V |
| C2112 | 4130406 150 nF 5% 50V | C2157 | 4000255 22 nF 10% 50V |
| C2113 | 4000248 100 pF 5% 50V | C2159 | 4130293 470 nF 10% 63V |
| C2117 | 4010173 4.7 nF 10% 50V | C2160 | 4010173 4.7 nF 10% 50V |
| C2134 | 4000248 100 pF 5% 50V | C2200 | 4200740 2.2 µF 25V |
| C2135 | 4000253 5.6 nF 10% 50V | C2201 | 4010202 3.9 nF 10% |
| C2136 | 4130405 470 nF 5% 50V | C2202 | 4130217 330 nF 5% 63V |
| C2137 | 4010192 47 nF 10% 50V | C2203 | 4130410 18 nF 10% |
| C2138 | 4200745 220 µF 16V | C2250 | 4010035 1 nF 10% 63V |

| | | | |
|---|---|---|---|
| P31 | 7210614 Socket 14 pol | P34 | 7220657 Plug 14 pol |
| P33 | 7220652 Plug 5 pol | P36 | 7220651 Plug 4 pol |

To P5 6275746 Wire w/sokets 5/5 pin
To P6 6275745 Wire w/sokets 14/14 pin

△ betyder at statisk elektricitet kan ødelægge komponenten.
△ indicates that static electricity may destroy the component.
△ bedeutet, daß statische Elektrizität die Komponente zerstören kann.
△ signifi que électricité statique peut detruire le composant.

* Speciel udvalgt eller bearbejdet eksemplar.
* Specially selected or adapted sample.
* Speziell ausgewähltes und bearbeitets Exemplar.
* Exemplaire, spécialement sélectionné et façonne.

Bang & Olufsen

# Beogram CD 5500

**Nyt CD-løbeværk**
**New CD drive mechanism**

Fra apparat nr. 05858372 er CD-løbeværket ændret fra en type CDM2 til en type CDM4

Ved udskiftning af et CDM2- til et CDM4-løbeværk skal løbeværket og servoprintet udskiftes som en samlet enhed (bestillingsnr. 8420158).

- CD-løbeværk, separat Bestillingsnr. 8420159
- Servoprint, separat Bestillingsnr. 8005264

Laserstrøm og fokus off-set *skal* justeres efter udskiftning af CD-løbeværk eller servoprint.

Servoprintet på et CDM4-løbeværk er ændret på følgende punkter:

| | Ny værdi | Bestillingsnr. |
|---|---|---|
| R3106 | 4,7 kΩ (trimmer) | 5370058 |
| R3143 | 22 Ω | 5011655 |
| R3145 | 680 kΩ | 5011704 |
| R3155 | 8,2 kΩ | 5011240 |
| R3159 | 15 kΩ | 5010053 |
| R3162 | 91 kΩ | 5011255 |
| R3163 | 15 kΩ | 5010468 |
| C2159 | 1,5 µF (bipolar) | 4200746 |
| C2141 | 470 nF | 4130405 |

- Der er monteret en modstand (R3214, 220k, bestillingsnr. 5011369) fra ben 6 på IC6103 til ben 21 på IC6101.
- Der er monteret en kondensator (C2143, 1,2 nF, bestillingsnr. 4100283) fra ben 1 på IC6104 til ben 5 på IC6101.

**Laserstrøm**

*Vigtigt:*
Efter udskiftning af CD løbeværket eller servo-PCB30 skal laserstrøm-potentiometeret 30R3106 forjusteres, inden apparatet tilsluttes lysnettet.

Tilslut et ohmmeter over 30R3105 + 30R3106. Juster 30R3106, indtil 30R3105 og 30R3106 tilsammen har en værdi på 1 kΩ.

Tilslut et DC-voltmeter over 30R3102.

Tilslut et oscilloskop til ben 27 på 30IC6101.

Ilæg testplade nr. 5 (plade uden fejl, bestillingsnr. 3634031) og tryk PLAY.

Kontroller på oscilloskopet, om der er HF signal. Hvis der ikke er HF signal, slukkes apparatet, og fejlen findes.

Hvis der er HF signal, spilles spor 1 på testplade 5, og 30R3106 justeres, til der måles 50mV ±5mV med DC-voltmeteret.

From unit no. 05858372 the CD drive mechanism has been changed from a CDM2 model to a CDM4 model.

When replacing a CDM2 model with a CDM4 model the drive mechanism and the servo PCB are to be replaced as a single unit (part no. 8420158).

- CD drive mechanism, separate Part no. 8420159
- Servo PCB, separate Part no. 8005264

The laser current and focus off-set *must* be adjusted after the CD drive mechanism or servo PCB has been replaced.

The servo PCB of the CDM4 drive mechanism has the following modifications:

| | New value | Part no. |
|---|---|---|
| R3105 | 4.7 kΩ (trimmer) | 5370058 |
| R3142 | 22 Ω | 5011655 |
| R3145 | 680 kΩ | 5011704 |
| R3155 | 8.2 kΩ | 5011240 |
| R3159 | 15 kΩ | 5010053 |
| R3162 | 91 kΩ | 5011255 |
| R3163 | 15 kΩ | 5010468 |
| C2159 | 1.5 µF (bipolar) | 4200746 |
| C2141 | 470 nF | 4130405 |

- A resistor (R3214, 220k, part no. 5011369) is mounted between pin 6 on IC6103 and pin 21 on IC6101.
- A capacitor (C2143, 1.2 nF, part no. 4100283) is mounted between pin 1 on IC6104 and pin 5 on IC6101.

**Laser current**

*Important:*
When replacing the CD mechanism or the servo PCB30, the laser current potentiometer 30R3106 must be preadjusted before the set is connected to mains.

Connect an ohmmeter across 30R3105 + 30R3106. Adjust 30R3106 until the combined value of 30R3105 and 30R3106 is 1 kΩ.

Connect a DC voltmeter across 30R3102.

Connect an oscilloscope to pin 27 of 30IC6101.

Load test disc no. 5 (disc without faults, part no. 3634031) and press PLAY.

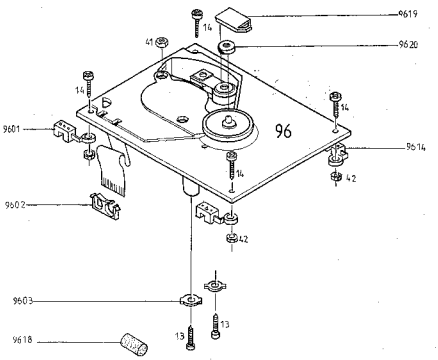
Check on the oscilloscope whether there is any HF signal. If not, switch off the CD player and locate the fault.

If there is an HF signal, play track 1 of test disc 5 and adjust 30R3106 until a reading of 50 mV ±5 mV is obtained on the DC voltmeter.

**Fokus off-set**
Se side 5-5.

**Focus off-set**
See page 5-5.

**List of Mechanical Parts**




30Modul 8005264 Servo PCB

96Modul 8420158 CD Mechanism and Servo PCB as a kit

96Modul 8420159 CD Mechanism without Servo PCB

| | |
|---|---|
| 9601 | 3333016 Rubber holders |
| 9602 | 3152593 Clamp f. flexible print |
| 9603 | 3034077 Transport screw |
| 9614 | 3333015 Rubber holders |
| 9618 | 3333017 Rubber foam |
| 9619 | 3154797 Cover |
| 9620 | 2893000 Hub |

**Survey of screws**

| | |
|---|---|
| 13 | 3013145 Screw 3x12 mm |
| 14 | 2034064 Screw 2x10 mm |
| 41 | 2380012 Nut M3 |
| 42 | 2380147 Nut |

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# Beogram CD 6500

Type 5136-5137-5138-5139-5140

## Beogram CD6500, type 5136, 5137, 5138, 5139, 5140

*See drawings on pages 4-1*

### List of mechanical parts

| | | |
|---|---|---|
| 9001 | 3414157 | Cabinet |
| | 3414358 | Cabinet, white |
| | 3114356 | Inner chassis |
| 9008 | 3454654 | Bottom |
| 9030 | 3451020 | CD tray |
| | 3450970 | CD tray, white |
| 9043 | 2542709 | Angle f. front |
| 9049 | 2569175 | Front panel |
| | 2569200 | Front panel, white |

Bang&Olufsen

# Beogram CD 7000

Type 5151, 5152, 5153, 5154, 5155

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## Beogram CD 7000

### List of Mechanical Parts

Exp. view, see page 4-1 and page 4-2

| | | |
|---|---|---|
| 9048 | 3114325 | Chassis front |
| 9049 | 2569300 | Front panel |
| | 2569301 | Front panel, white |
| 08T1 | 8005282 | PCB8 w. Transformer |

### Screws

| | | |
|---|---|---|
| 2 | 2043011 | Screw AM 4x8 |

### Owners Manuals

| | |
|---|---|
| 3505605 | Danish |
| 3505606 | Swedish |
| 3505607 | Finnish |
| 3505608 | English |
| 3505609 | German |
| 3505610 | Dutch |
| 3505611 | French |
| 3505612 | Italian |
| 3505613 | Spanish |
| 3505614 | USA - GB |
| 3505615 | CDN - F |

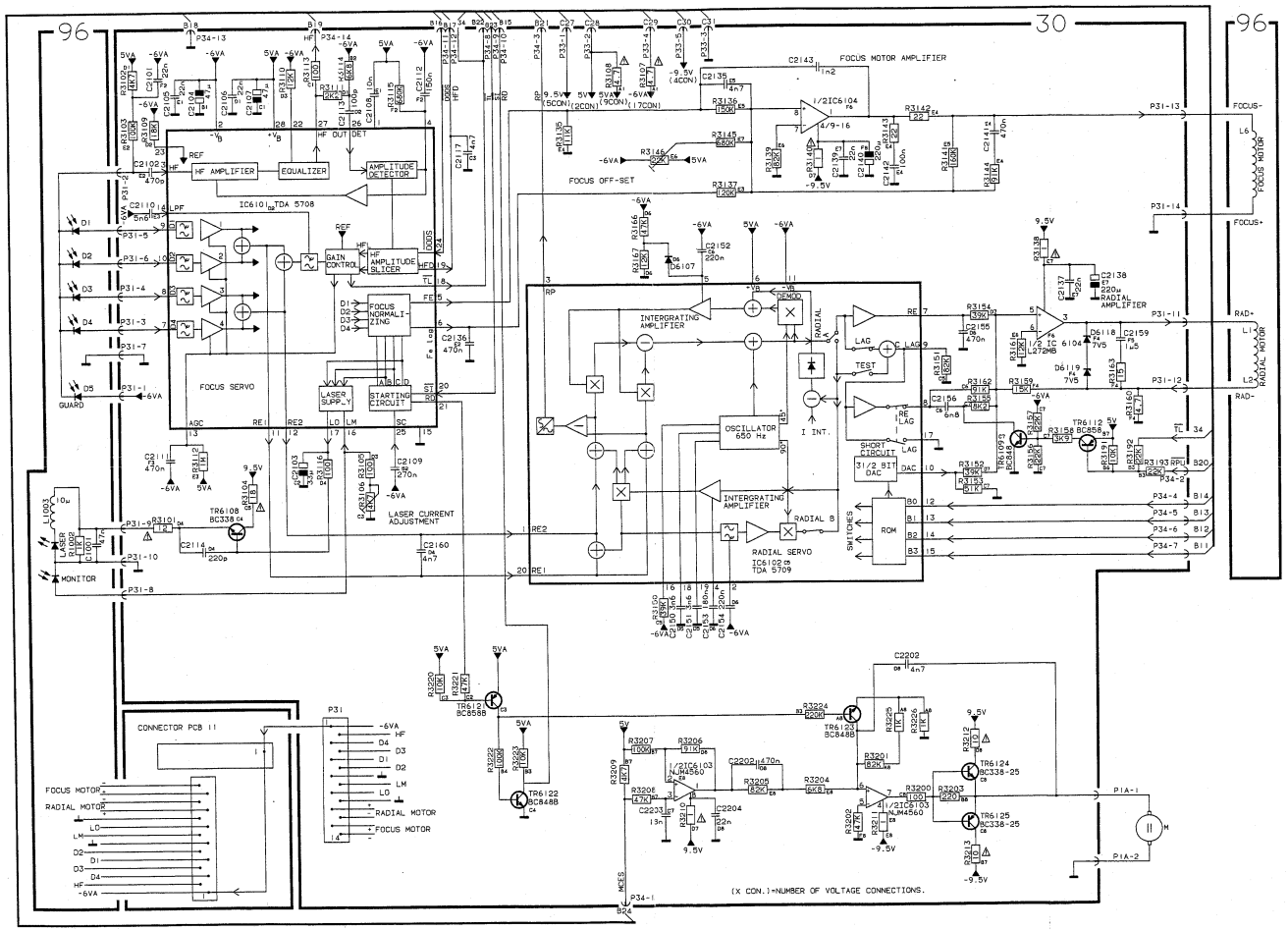
*All other electrical and mechanical parts are identical with Beogram CD 6500*

Bang&Olufsen

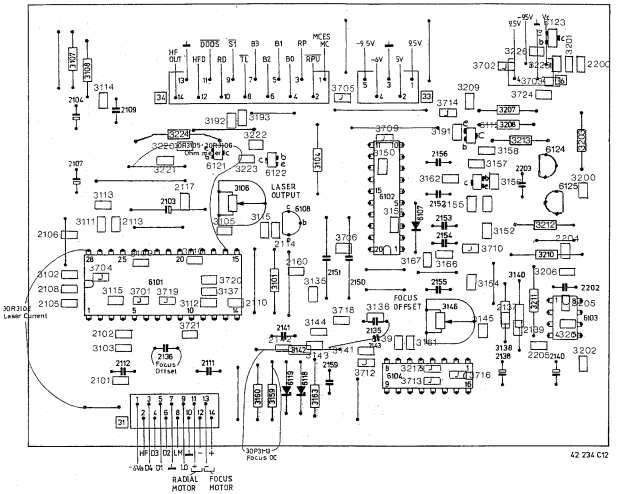
# CD-Mechanism
# Version II
# Beogram CD 7000

Bang&Olufsen

**DIAGRAM A** (Servo and Disc Motor System)



## Servo PCB 30




## LIST OF ELECTRICAL PARTS

| 20 | 51 | 103 | 125 | 134 | 209 | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

△ indicates that static electricity may destroy the component.

Resistors not referred to are standard, see page 3-2

**PCB 30, 8005288**
**Servo**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| IC6101△ | 8340991 | **125** | TDA 5708 C3 | IC6103 | 8340993 | **103** | NJM 4560D |
| IC6102△ | 8340992 | **134** | TDA 5709 | IC6104 | 8340683 | **103** | L 272BH |
| TR6108 | 8320721 | **20** | BC 338-16 | TR6122- | 8320615 | **51** | BC 848B |
| TR6109 | 8320615 | **51** | BC 848B | TR6123 | | | |
| TR6112 | 8320616 | **51** | BC 858B | TR6125 | 8320523 | **20** | BC 328-25 |
| TR6121 | 8320616 | **51** | BC 858B | | | | |
| D6107 | 8300058 | **209** | 1N 4148 | D6118- D6119 | 8300570 | **209** | HZ 7C2 7V5 |
| R3101 | 5020966 | | 12Ω 5% 1/3W | R3146 | 5370327 | | 22kΩ 20% 0.1W |
| R3104 | 5020967 | | 18Ω 5% 1/3W | R3160 | 5020971 | | 4.7Ω 1% 1/4W |
| R3106 | 5370324 | | 4,7kΩ 20% 0.1W | R3207 | 5020263 | | 100kΩ 1% 1/4W |
| R3107- R3108 | 5020965 | | 4.7Ω 2% 1/3W | R3208 | 5020969 | | 47kΩ 1% 1/4W |
| R3138 | 5020964 | | 1.0Ω 2% 1/3W | R3210- R3211 | 5020964 | | 1.0Ω 2% 1/3W |
| R3140 | 5020964 | | 1.0Ω 2% 1/3W | R3212- | 5020489 | | 10Ω 10% 0,30W |
| R3141 | 5011587 | | 160kΩ 1% 1/8W | R3213 | | | |
| C2101 | 4000255 | | 22nF 10% 50V | C2139 | 4000255 | | 22nF 10% 50V |
| C2102 | 4000249 | | 470pF 5% 50V | C2140 | 4200745 | | 220µ 16V |
| C2103 | 4200414 | | 33µ -10+50% 16V | C2141 | 4130405 | | 470nF 50V |
| C2104 | 4200482 | | 47µ 20% 10V | C2142 | 4000256 | | 100nF 10% 50V |
| C2105- C2106 | 4000255 | | 22nF 10% 50V | C2143 | 4100283 | | 1.2nF 2% 250V |
| C2107 | 4200482 | | 47µ 20% 10V | C2150- C2151 | 4130424 | | 3.6nF 1% 160V |
| C2108 | 4000254 | | 10nF 10% 50V | C2152 | 4130206 | | 220nF 10% 100V |
| C2109 | 4130379 | | 270nF 5% 63V | C2153 | 4130314 | | 180nF 10% 63V |
| C2110 | 4000253 | | 5.6nF 10% 50V | C2154 | 4130206 | | 220nF 10% 100V |
| C2111 | 4130405 | | 470nF 10% 50V | C2155 | 4130405 | | 470nF 10% 50V |
| C2112 | 4130406 | | 150nF 5% 50V | C2156 | 4130338 | | 6.8nF 5% 100V |
| C2113 | 4000248 | | 100pF 5% 50V | C2159 | 4200746 | | 1.5µ 50V Bipolar |
| C2114 | 4000233 | | 220pF 5% 50V | C2160 | 4010173 | | 4.7nF 10% 50V |
| C2117 | 4010173 | | 4.7nF 10% 50V | C2200 | 4010173 | | 4.7nF 10% 50V |
| C2135 | 4130370 | | 4.7nF 5% | C2202 | 4130405 | | 470nF 10% 50V |
| C2136 | 4130405 | | 470nF 10% 50V | C2203 | 4130221 | | 18nF 5% 63V |
| C2137 | 4000255 | | 22nF 10% 50V | C2204- C2205 | 4000255 | | 22nF 10% 50V |
| C2138 | 4200745 | | 220µ 16V | | | | |
| P31 | 7210614 | | Socket, 14 pol | P34 | 7220657 | | Plug, 14 pole |
| P33 | 7220652 | | Plug, 5 pole | P36 | 7220651 | | Plug, 4 pole |
| To P5 | 6275746 | | Wire w/sockets 5/5 pin | | | | |
| To P6 | 6275745 | | Wire w/sockets 14/14 pin | | | | |
| | 8420176 | | CD Mechanism with servo | | | | |
| | 8420177 | | CD Mechanism without servo | | | | |
| | 8005288 | | Servo PCB | | | | |
| | 6276561 | | Wire bundle | | | | |